

GROUP 17

ENGINE AND EMISSION CONTROL

CONTENTS

ENGINE CONTROL.....	17-3	DIAGNOSTIC TROUBLESHOOTING STRATEGY	17-10
GENERAL INFORMATION	17-3	DIAGNOSTIC FUNCTION	17-11
ENGINE CONTROL SYSTEM DIAGNOSIS	17-3	DIAGNOSTIC TROUBLE CODE CHART	17-13
INTRODUCTION	17-3	DIAGNOSTIC TROUBLE CODE PROCEDURES	17-14
TROUBLESHOOTING STRATEGY ...	17-3	SYMPTOM CHART	17-37
SYMPTOM CHART	17-3	SYMPTOM PROCEDURES	17-37
SYMPTOM PROCEDURES	17-4	DATA LIST REFERENCE TABLE	17-58
SPECIAL TOOL.....	17-7	ECM TERMINAL VOLTAGE REFERENCE CHART FOR AUTO-CRUISE CONTROL SYSTEM OPERATION.....	17-60
ACCELERATOR PEDAL.....	17-8	SPECIAL TOOLS	17-62
REMOVAL AND INSTALLATION	17-8	ON-VEHICLE SERVICE	17-64
AUTO-CRUISE CONTROL	17-9	AUTO-CRUISE CONTROL SWITCH CHECK.....	17-64
GENERAL INFORMATION	17-9	AUTO-CRUISE CONTROL SYSTEM COMPONENT CHECK.....	17-67
AUTO-CRUISE CONTROL SYSTEM DIAGNOSIS	17-10	AUTO-CRUISE CONTROL.....	17-69
INTRODUCTION TO AUTO-CRUISE CONTROL SYSTEM DIAGNOSIS.....	17-10	REMOVAL AND INSTALLATION.....	17-69

Continued on next page

EMISSION CONTROL <MFI>	17-70		
GENERAL INFORMATION	17-70		
SERVICE SPECIFICATIONS.	17-70		
DIAGNOSIS	17-70		
SPECIAL TOOLS.	17-71		
VACUUM HOSES	17-72		
VACUUM HOSE ROUTING.	17-72		
VACUUM CIRCUIT DIAGRAM	17-73		
VACUUM HOSE INSTALLATION	17-73		
VACUUM HOSE CHECK.	17-73		
POSITIVE CRANKCASE VENTILATION SYSTEM.	17-74		
GENERAL INFORMATION (POSITIVE CRANKCASE VENTILATION SYSTEM).	17-74		
COMPONENT LOCATION	17-74		
POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM CHECK.	17-75		
POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM CHECK.	17-75		
EVAPORATIVE EMISSION CONTROL SYSTEM.	17-76		
GENERAL INFORMATION (EVAPORATIVE EMISSION SYSTEM).	17-76		
COMPONENT LOCATION	17-77		
PURGE CONTROL SYSTEM CHECK (PURGE FLOW CHECK).	17-78		
EVAPORATIVE EMISSION PURGE SOLENOID CHECK.	17-79		
MASS AIRFLOW SENSOR CHECK	17-79		
		INTAKE AIR TEMPERATURE SENSOR CHECK.	17-79
		MANIFOLD ABSOLUTE PRESSURE SENSOR CHECK.	17-80
		ENGINE COOLANT TEMPERATURE SENSOR CHECK.	17-80
		THROTTLE POSITION SENSOR CHECK.	17-80
		CRANKSHAFT POSITION SENSOR CHECK.	17-80
		EXHAUST GAS RECIRCULATION (EGR) SYSTEM	17-81
		GENERAL INFORMATION (EXHAUST GAS RECIRCULATION SYSTEM) <CALIFORNIA>	17-81
		COMPONENT LOCATION.	17-82
		EGR VALVE (STEPPER MOTOR) CHECK.	17-82
		EGR VALVE (STEPPER MOTOR) CLEANING.	17-84
		MASS AIRFLOW SENSOR CHECK	17-84
		INTAKE AIR TEMPERATURE SENSOR CHECK.	17-84
		MANIFOLD ABSOLUTE PRESSURE SENSOR CHECK.	17-84
		ENGINE COOLANT TEMPERATURE SENSOR CHECK.	17-84
		ACCELERATOR PEDAL POSITION SENSOR CHECK.	17-84
		CRANKSHAFT POSITION SENSOR CHECK.	17-84
		REMOVAL AND INSTALLATION.	17-85
		EVAPORATIVE EMISSION CANISTER AND FUEL TANK PRESSURE RELIEF VALVE	17-87
		REMOVAL AND INSTALLATION.	17-87
		INSPECTION	17-88

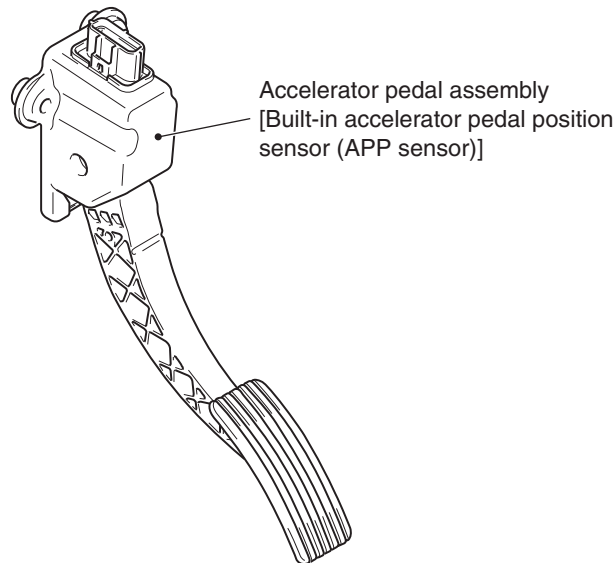
ENGINE CONTROL

GENERAL INFORMATION

M1171000100750

For the accelerator system, an electronic throttle actuator control system is utilized, eliminating the accelerator cable.

CONSTRUCTION DIAGRAM



AC505671AB

ENGINE CONTROL SYSTEM DIAGNOSIS

INTRODUCTION

M1171002000339

If there is a malfunction in the engine control system, the accelerator pedal or throttle body may be faulty.

TROUBLESHOOTING STRATEGY

M1171002100369

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will be sure that you have exhausted most of the possible ways to find an engine control system fault.

1. Gather information from the customer.
2. Verify that the condition described by the customer exists.
3. Find the malfunction by following the Symptom Chart.
4. Verify that the malfunction is eliminated.

SYMPTOM CHART

M1171002200407

Symptom	Inspection procedure	Reference page
Throttle valve will not fully open or close	1	P.17-4
Accelerator pedal operation not smooth (over acceleration)	2	P.17-5

SYMPTOM PROCEDURES

Inspection Procedure 1: Throttle Valve will not Fully Open or Close

COMMENT

The throttle body or accelerator pedal position sensor (APP sensor) is suspected.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the throttle body.
- Malfunction of the APP sensor.
- Malfunction of the engine control module (ECM).

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: M.U.T.-III USB Cable
 - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, read the MFI system diagnostic trouble code.

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Ensure that the ignition switch is at the "LOCK" (OFF) position.
- (2) Start up the personal computer.
- (3) Connect special tool MB991827 to special tool MB991824 and the personal computer.
- (4) Connect special tool MB991910 to special tool MB991824.
- (5) Connect special tool MB991910 to the data link connector.
- (6) Turn the power switch of special tool MB991824 to the "ON" position.

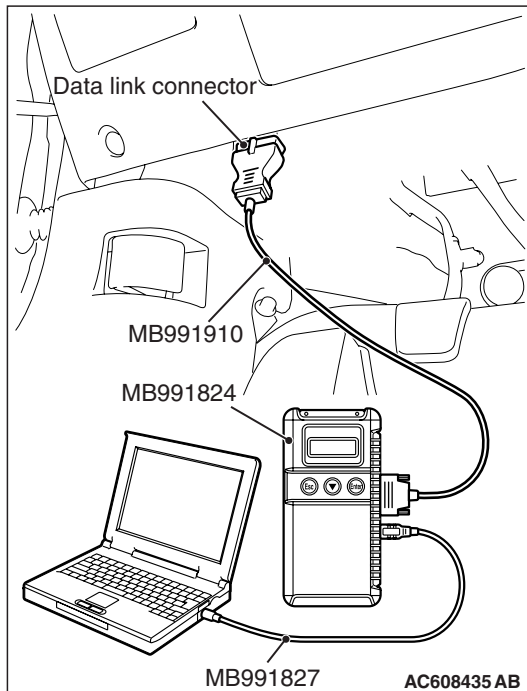
NOTE: When special tool MB991824 is energized, special tool MB991824 indicator light will be illuminated in a green color.

- (7) Start the M.U.T.-III system on the personal computer.
- (8) Turn the ignition switch to the "ON" position.
- (9) Check for MFI system diagnostic trouble code. (Refer to GROUP 13A –MFI Diagnosis –Diagnostic Function –How to Read and Erase Diagnostic Trouble Code [P.13A-10](#)).
- (10) Turn the ignition switch to the "LOCK" (OFF) position, and then remove scan tool MB991958 in the reverse order of installation.

Q: Is any DTC set?

YES : Repair MFI system. (Refer to GROUP 13A –MFI Diagnosis, Diagnostic Trouble Code Chart [P.13A-46](#)). Then go to Step 2.

NO : Go to Step 2.



STEP 2. Retest the system.

Q: Does the throttle valve work with the accelerator pedal operation?

YES : The procedure is complete.

NO : Return to Step 1.

Inspection Procedure 2: Accelerator Pedal Operation not Smooth (Over Acceleration)

COMMENT

The accelerator pedal, its installation condition or the APP sensor is suspected.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the accelerator pedal.
- Incorrectly installed accelerator pedal.
- Malfunction of the APP sensor.

DIAGNOSIS

Required Special Tools:

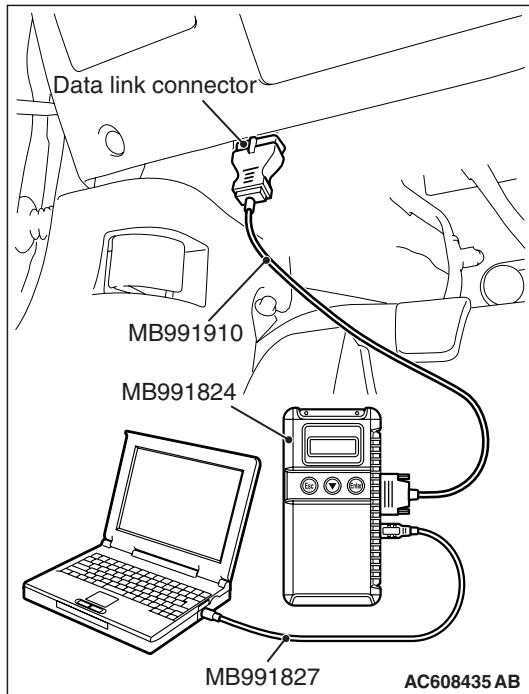
- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: M.U.T.-III USB Cable
 - MB991910: M.U.T.-III Main Harness A

STEP 1. Check if the accelerator pedal is installed correctly.

Q: Is the accelerator pedal installed correctly?

YES : Go to Step 2.

NO : Remove and reinstall the accelerator pedal. (Refer to [P.17-8](#)). Go to Step 3.



STEP 2. Using scan tool MB991958, read the MFI system diagnostic trouble code.

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Ensure that the ignition switch is at the "LOCK" (OFF) position.
- (2) Start up the personal computer.
- (3) Connect special tool MB991827 to special tool MB991824 and the personal computer.
- (4) Connect special tool MB991910 to special tool MB991824.
- (5) Connect special tool MB991910 to the data link connector.
- (6) Turn the power switch of special tool MB991824 to the "ON" position.

NOTE: When special tool MB991824 is energized, special tool MB991824 indicator light will be illuminated in a green color.

- (7) Start the M.U.T.-III system on the personal computer.
- (8) Turn the ignition switch to the "ON" position.
- (9) Check for MFI system diagnostic trouble code. (Refer to GROUP 13A –MFI Diagnosis –Diagnostic Function –How to Read and Erase Diagnostic Trouble Code [P.13A-10](#)).
- (10) Turn the ignition switch to the "LOCK" (OFF) position, and then remove scan tool MB991958 in the reverse order of installation.

Q: Is any DTC set?

YES : Repair MFI system. (Refer to GROUP 13A –MFI Diagnosis, Diagnostic Trouble Code Chart [P.13A-46](#)). Then go to Step 3.

NO : Go to Step 3.

STEP 3. Retest the system.

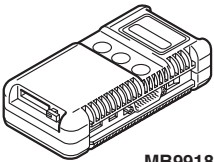
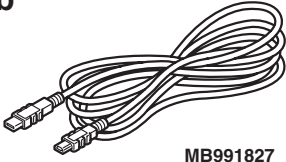
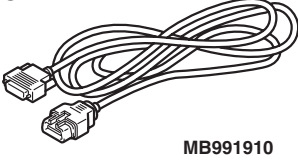
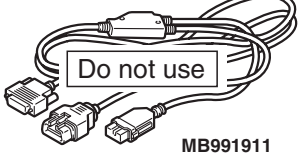
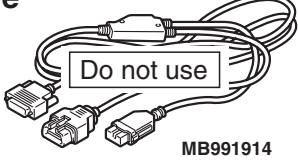
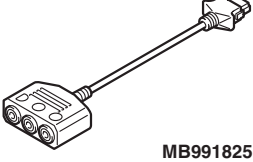
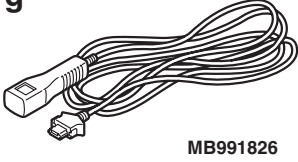
Q: Does the accelerator pedal work normally?

YES : The procedure is complete.

NO : Return to Step 1.

SPECIAL TOOL

M1171000600119

Tool	Tool number and name	Supersession	Application
a  MB991824 b  MB991827 c  MB991910 d  MB991911 e  MB991914 f  MB991825 g  MB991826 MB991958	MB991958 a: MB991824 b: MB991827 c: MB991910 d: MB991911 e: MB991914 f: MB991825 g: MB991826 Scan tool (M.U.T.-III sub assembly) a: Vehicle communication interface (V. C. I.) b: M.U.T.-III USB cable c: M.U.T.-III main harness A (Vehicles with CAN communication system) d: M.U.T.-III main harness B (Vehicles without CAN communication system) e: M.U.T.-III main harness C (for Daimler Chrysler models only) f: M.U.T.-III measurement adapter g: M.U.T.-III trigger harness	MB991824-KIT <i>NOTE: g: MB991826 M.U.T.-III Trigger Harness is not necessary when pushing V.C.I. ENTER key.</i>	⚠ CAUTION For vehicles with CAN communication, use M.U.T.-III main harness A to send simulated vehicle speed. If you connect M.U.T.-III main harness B instead, the CAN communication does not function correctly. Checking diagnostic trouble code

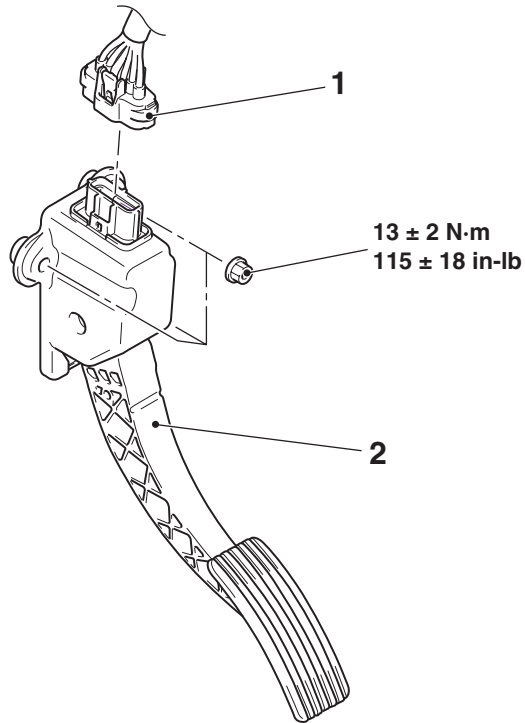
ACCELERATOR PEDAL

REMOVAL AND INSTALLATION

M1171003000547

Pre-removal and post-installation operation

- Bottom Cover (driver's side) Removal and Installation (Refer to GROUP 52A –Instrument Lower Panel [P.52A-7](#)).



AC610167AB

Removal steps

1. Accelerator pedal position sensor connector
2. Accelerator pedal assembly

AUTO-CRUISE CONTROL

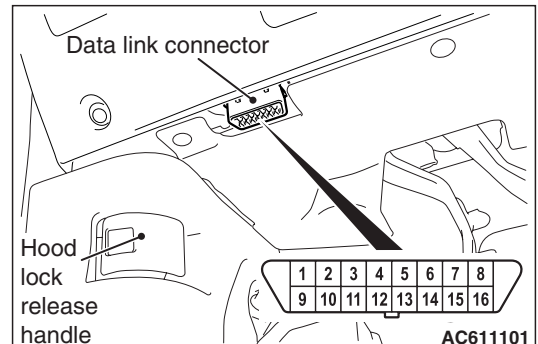
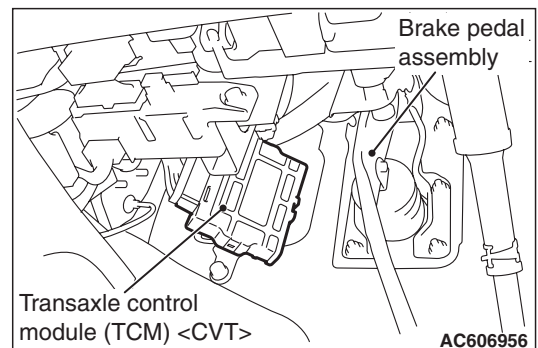
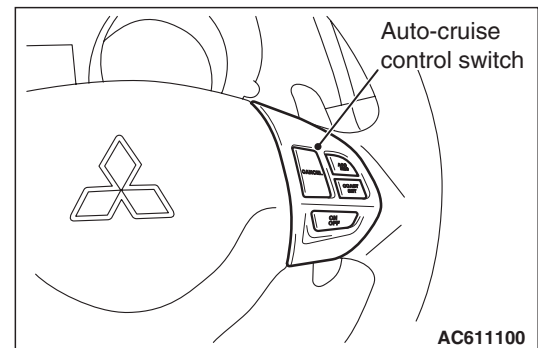
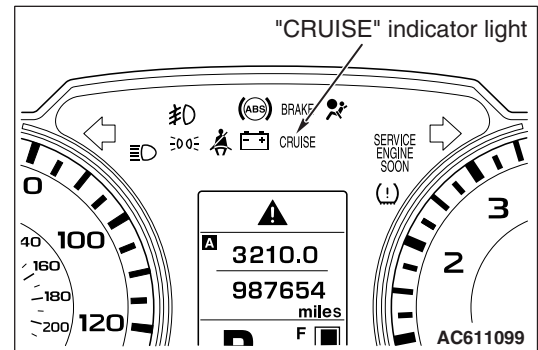
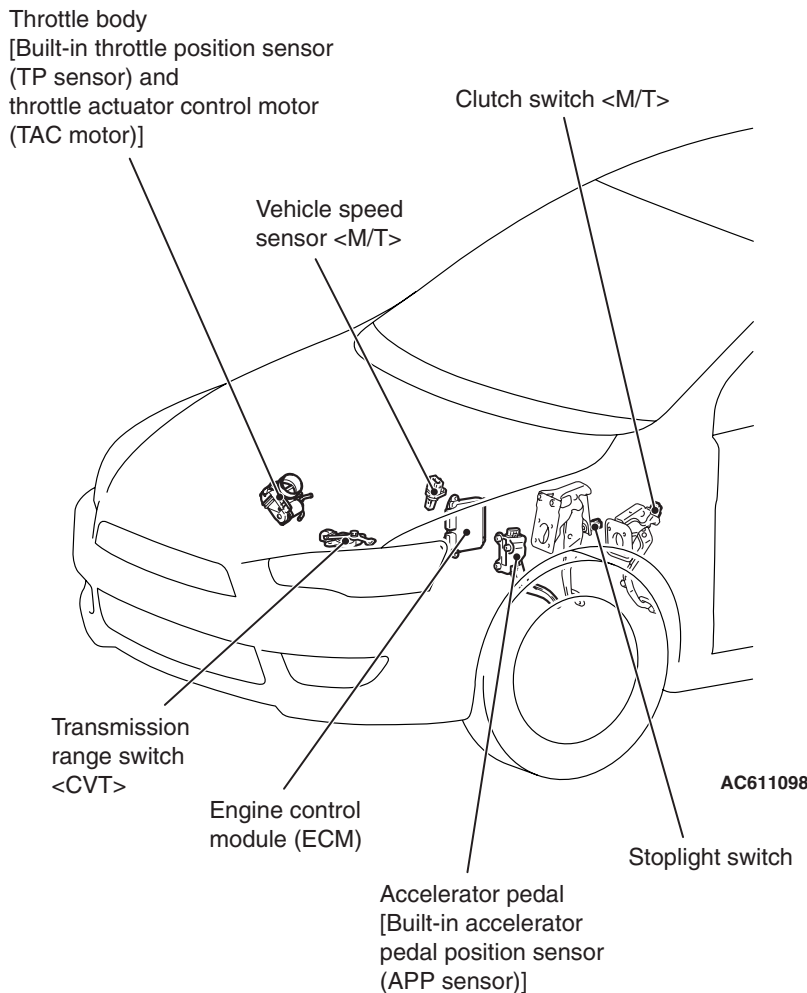
GENERAL INFORMATION

By using the auto-cruise control system, the driver can drive at preferred speeds in a range of approximately 40 to 200 km/h (25 to 125 mph) without depressing the accelerator pedal.

For this auto-cruise control system, in conjunction with the electronic throttle valve control system, the engine control module (ECM) electronically controls the throttle valve.

M1172000100582

CONSTRUCTION DIAGRAM



AC611102 AD

AUTO-CRUISE CONTROL SYSTEM DIAGNOSIS

INTRODUCTION TO AUTO-CRUISE CONTROL SYSTEM DIAGNOSIS

M1172003300336

The auto-cruise control system allows driving without stepping on the accelerator pedal by setting a random speed between 40 km/h (25 mph) and 200 km/h (125 mph). Malfunctions in this system can be investigated by the following methods.

Auto-cruise control system diagnostic trouble codes

The auto-cruise control system consists of the ECM, control switches and sensors. The control switches and sensors monitor the state of the vehicle. The ECM controls the throttle valve opening angle in the throttle body in accordance with the input signals

from the switches and sensors. If the ECM detects a malfunction on any of those components, the ECM estimates where the problem may be occurring, and will set a diagnostic trouble code. Diagnostic trouble codes cover the auto-cruise control switch, stoplight switch and ECM.

DIAGNOSTIC TROUBLESHOOTING STRATEGY

M1172002000707

Use these steps to plan your diagnostic strategy. If you follow them carefully, you will check most of the possible causes of an auto-cruise control system malfunction.

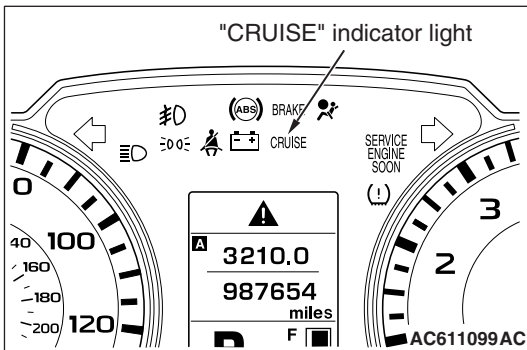
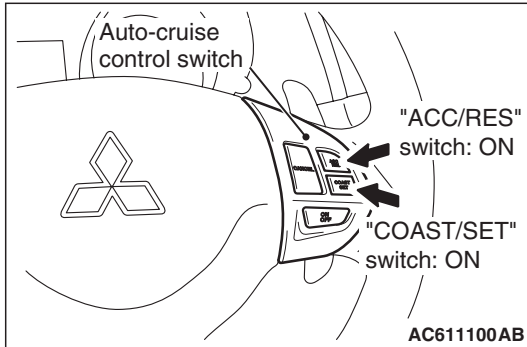
1. Gather information from the customer.
2. Verify that the condition described by the customer exists.
3. Check the vehicle for any auto-cruise control system DTC. (Refer to [P.17-11](#), Diagnostic Function –How to Read Diagnostic Trouble Codes).
4. If you can verify the condition but no auto-cruise control system DTCs are set, the malfunction may be intermittent. (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunctions [P.00-13](#)).
5. If you can verify the condition but there are no auto-cruise control system DTCs, find the fault. (Refer to [P.17-37](#), Symptom Chart).
6. If there is an auto-cruise control system DTC, record the number of the code, then erase the code. (Refer to [P.17-11](#), Diagnostic Function – How to Erase Diagnostic Trouble Codes).
7. Re-create the auto-cruise control system DTC set conditions to see if the same auto-cruise control system DTC will set again. (Refer to [P.17-11](#), Diagnostic Function –How to Read Diagnostic Trouble Codes).
 - If the same auto-cruise control system DTC sets again, perform the diagnostic procedures for the set code. (Refer to [P.17-13](#), Diagnostic Trouble Code Chart).

DIAGNOSTIC FUNCTION

M1172004900223

HOW TO READ DIAGNOSTIC TROUBLE CODES

1. Turn the ignition switch to the "ON" position while pushing the "COAST/SET" switch. Then, within one second, release the "COAST/SET" switch and push the "ACC/RES" switch.



2. Read a diagnostic trouble code by observing the flash display pattern of the "CRUISE" indicator light in the combination meter.

Diagnostic result display method when using the "CRUISE" indicator light

When the diagnostic trouble code number 23 is output	When no diagnostic trouble code is output
ON OFF Pause time: 3 s Ten digit Digit division: 2 s First digit 0.5 s 1.5 s 1.5 s AC604884 AC	ON OFF Continuous ON and OFF signals at intervals of 0.25 s 0.25 s AC604885 AC

NOTE: Other on-board diagnostic items are also output as voltage waveforms corresponding to diagnostic trouble code numbers.

HOW TO ERASE DIAGNOSTIC TROUBLE CODES

Disconnect the negative (-) battery cable.

HOW TO CONNECT THE SCAN TOOL (M.U.T.-III).**Required Special Tools:**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: Vehicle Communication Interface (V.C.I.)
 - MB991827: M.U.T.-III USB Cable
 - MB991910: M.U.T.-III Main Harness A

⚠ CAUTION

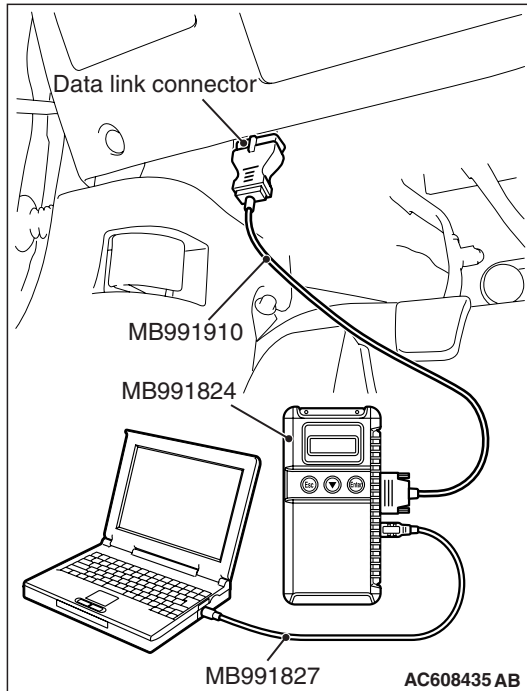
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

1. Start up the personal computer.
2. Connect special tool MB991827 to special tool MB991824 and the personal computer.
3. Connect special tool MB991910 to special tool MB991824.
4. Connect special tool MB991910 to the data link connector.
5. Turn the power switch of special tool MB991824 to the "ON" position.

NOTE: When special tool MB991824 is energized, special tool MB991824 indicator light will be illuminated in green color.

6. Start the M.U.T.-III system on the personal computer.

NOTE: Disconnecting scan tool MB991958 is the reverse of the connecting sequence, making sure that the ignition switch is at the "LOCK" (OFF) position.

**HOW TO READ DATA LIST****Required Special Tools:**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: M.U.T.-III USB Cable
 - MB991910: M.U.T.-III Main Harness A

1. Connect scan tool MB991958 to the data link connector.
2. Turn the ignition switch to the "ON" position.
3. Select "System Select" from the start-up screen.
4. Select "From 2006 MY" of "Model Year." When the "Vehicle Information" is displayed, check the contents.
5. "Select "AUTO CRUISE" from "System List", and press the "OK" button.

NOTE: When the "Loading Option Setup" list is displayed, check the applicable item.

6. Select the "MITSUBISHI."
7. Select the "Data List."

NOTE: When the "Data List Reference Table" button is selected, the service data reference table is displayed, and the normal values can be checked.

8. Choose an appropriate item.

9. Turn the ignition switch to the "LOCK" (OFF) position.
10. Disconnect scan tool MB991958.

HOW TO DIAGNOSE THE CAN BUS LINE

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: M.U.T.-III USB Cable
 - MB991910: M.U.T.-III Main Harness A
1. Connect scan tool MB991958 to the data link connector.
 2. Turn the ignition switch to the "ON" position.
 3. Select the "CAN Bus Diagnosis" from the start-up screen.
 4. When the vehicle information is displayed, confirm that it matches the vehicle whose CAN bus lines will be diagnosed.
 - If they match, go to step 8.
 - If not, go to step 5.
 5. Select the "view vehicle information" button.
 6. Enter the vehicle information and select the "OK" button.
 7. When the vehicle information is displayed, confirm again that it matches the vehicle which whose CAN bus lines will be diagnosed.
 - If they match, go to step 8.
 - If not, go to step 5.
 8. Press the "OK" button.
 9. When the optional equipment screen is displayed, choose the one which the vehicle is fitted with, and then select the "OK" button.
 10. Turn the ignition switch to the "LOCK" (OFF) position.
 11. Disconnect scan tool MB991958.

DIAGNOSTIC TROUBLE CODE CHART

M1172002200648

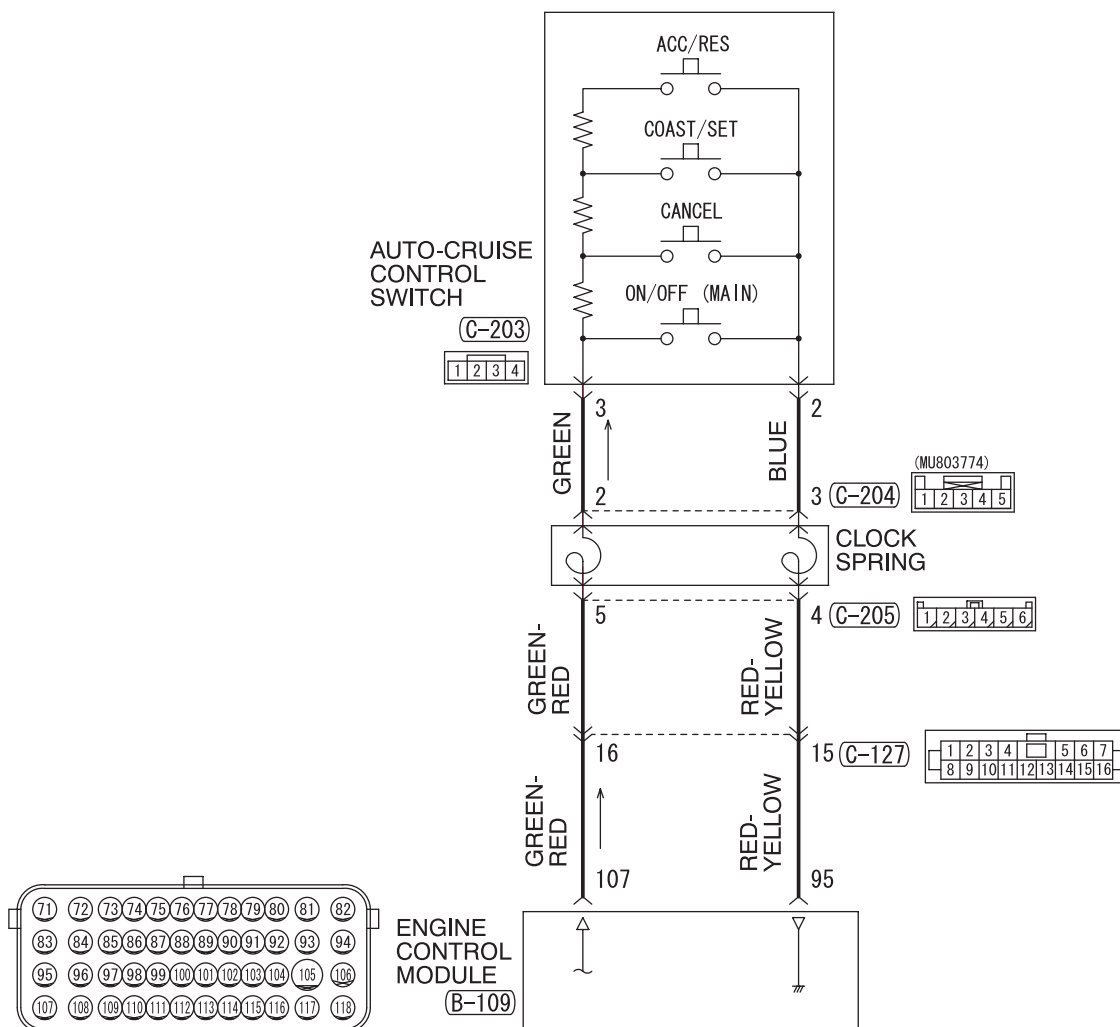
Check according to the inspection chart that is appropriate for the diagnostic trouble code.

Diagnostic trouble code number	Inspection Item	Reference page
15	Auto-cruise control switch system	P.17-14
22	Stoplight switch system	P.17-26
23	ECM and its related components	P.17-35

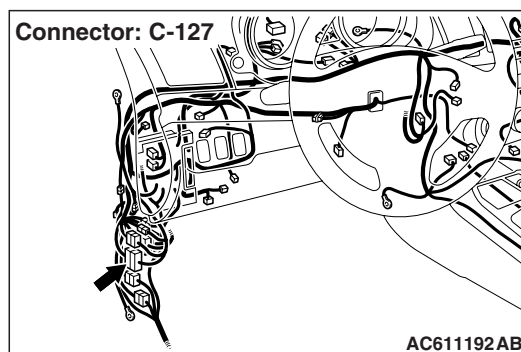
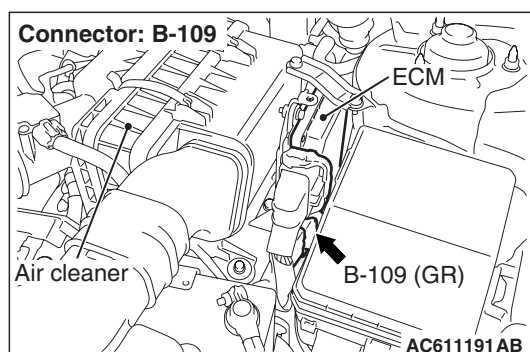
DIAGNOSTIC TROUBLE CODE PROCEDURES

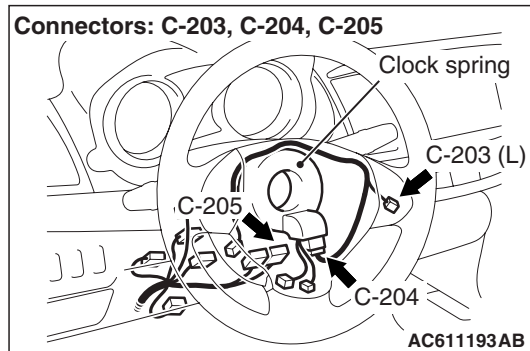
DTC 15: Auto-cruise Control Switch System

Auto-cruise Control Switch System Circuit



AC611190AB





CIRCUIT OPERATION

This circuit judges the signals of each switch ["ON/OFF" (MAIN), "CANCEL", "COAST/SET" and "ACC/RES"] of the auto-cruise control switch. The ECM detects the state of the auto-cruise control switch by sensing the voltages shown below.

- When all switches are OFF: 4.7 - 5.0 volts
- When the "ON/OFF" (MAIN) switch is "ON": 0 - 0.5 volt
- When the "CANCEL" switch is "ON": 1.0 - 1.8 volts
- When the "COAST/SET" switch is "ON": 2.3 - 3.0 volts
- When the "ACC/RES" switch is "ON": 3.5 - 4.2 volts

DTC SET CONDITIONS

Check Condition

- The "CRUISE" indicator light illuminates.

Judgement Criteria

- This DTC is set when the "COAST/SET" switch or "ACC/RES" switch is stuck to ON.

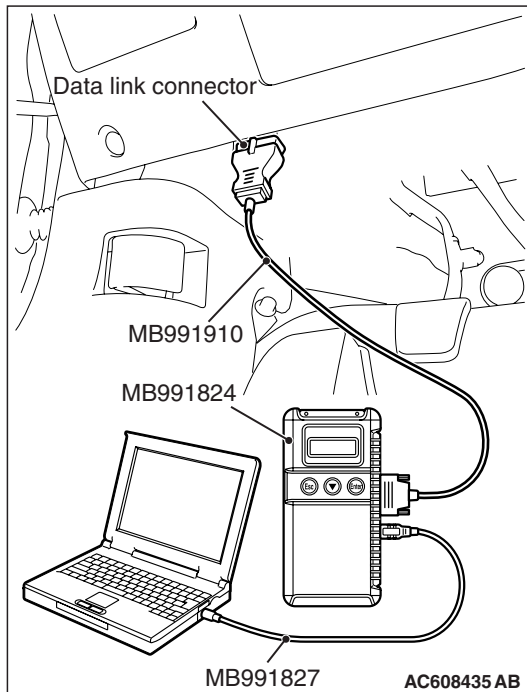
TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Damaged harness or connector.
- Malfunction of the auto-cruise control switch.
- Malfunction of the clock spring.
- Malfunction of the ECM.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: M.U.T.-III USB Cable
 - MB991910: M.U.T.-III Main Harness A
- MB991223: Harness Set
- MB992006: Extra Fine Probe
- MB992110: Power Plant ECU Check Harness



STEP 1. Using scan tool MB991958, check the data list item 75: Cancel switch, item 86: Main switch, item 91: Resume switch and item 92: Set switch.

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector (Refer to P.17-11).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to P.17-11).
 - Item 75: Cancel switch.
 - When "CANCEL" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "CANCEL" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
 - Item 86: Main switch.
 - When "ON/OFF" (MAIN) switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "ON/OFF" (MAIN) switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
 - Item 91: Resume switch.
 - When "ACC/RES" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "ACC/RES" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
 - Item 92: Set switch.
 - When "COAST/SET" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "COAST/SET" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 18.

NO : Go to Step 2.

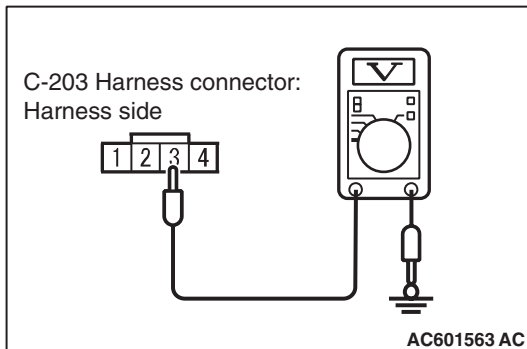
STEP 2. Measure the power supply voltage at auto-cruise control switch connector C-203 by backprobing.

- (1) Remove the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring P.52B-367).
- (2) With the harness connector, remove the auto-cruise control switch (Refer to P.17-69).
- (3) Connect the negative (-) battery cable.
- (4) Do not disconnect auto-cruise control switch connector C-203.
- (5) Turn the ignition switch to the "ON" position.
- (6) All auto-cruise control switch to the "OFF" position.
- (7) Measure the power supply voltage between auto-cruise control switch connector C-203 terminal 3 and ground by backprobing.
- (8) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage between 4.7 and 5.0 volts?

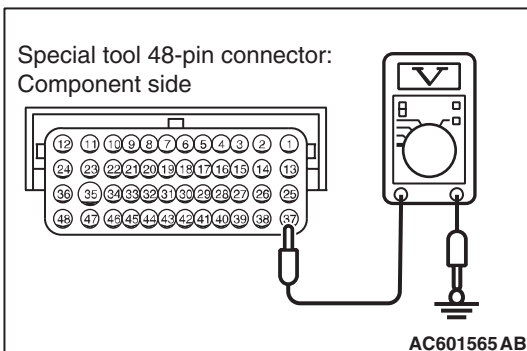
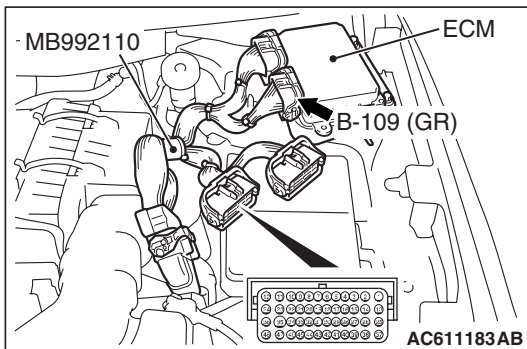
YES : Go to Step 9.

NO : Go to Step 3.



STEP 3. Measure the power supply voltage at ECM connector B-109.

- (1) Remove the ECM [Refer to GROUP 13A, Engine Control Module (ECM) P.13A-952].
- (2) Connect special tool MB992110 between the ECM and the body-side harness connector.
- (3) Turn the ignition switch to the "ON" position.
- (4) All auto-cruise control switch to the "OFF" position.



- (5) Measure the power supply voltage between special tool 48-pin connector terminal 37 (ECM connector B-109 terminal 107) and ground.
- (6) Turn the ignition switch to the "LOCK" (OFF) position.
- (7) Disconnect special tool MB992110 between the ECM and the body-side harness connector.
- (8) Install the ECM [Refer to GROUP 13A, Engine Control Module (ECM) P.13A-952].

Q: Is the measured voltage between 4.7 and 5.0 volts?

YES : Go to Step 6.

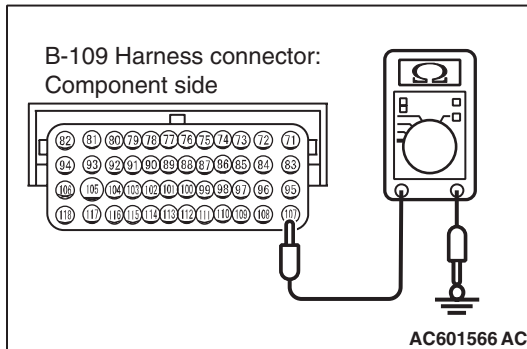
NO : Go to Step 4.

STEP 4. Check ECM connector B-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Go to Step 5.

NO : Repair or replace the faulty connector (Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#)). Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 19.



STEP 5. Check the harness for short circuit to ground between the ECM connector B-109 terminal 107 and the auto-cruise control switch connector C-203 terminal 3.

- (1) Disconnect ECM connector B-109 and measure at the harness connector side.
- (2) Turn the ignition switch to the "LOCK" (OFF) position.
- (3) Measure the continuity between ECM connector B-109 terminal 107 and ground.
- (4) Reconnect ECM connector B-109.

Q: Is the measured continuity open circuit?

YES : Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 17.

NO : Go to Step 6.

STEP 6. Check intermediate connector C-127, auto-cruise control switch connector C-203 and clock spring connectors C-204 and C-205 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 7.

NO : Repair or replace the faulty connector (Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#)). Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 19.

STEP 7. Check the clock spring.

Refer to GROUP 52B, Air Bag Modules and Clock Spring Inspection [P.52B-375](#).

Q: Is the clock spring in good condition?

YES : Go to Step 8.

NO : Replace the clock spring (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 19.

STEP 8. Check the harness wire between ECM connector B-109 terminal 107 and auto-cruise control switch connector C-203 terminal 3 for damage.

Q: Are the harness wires in good condition?

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunction [P.00-13](#)). Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 19.

NO : Repair the damaged harness wire. Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 19.

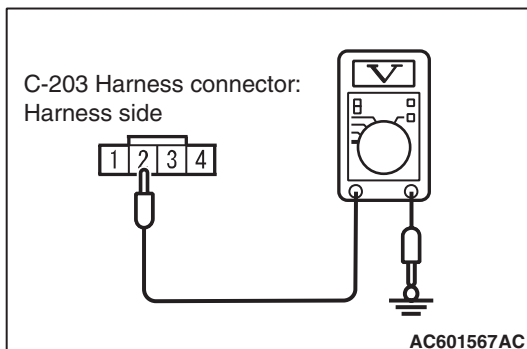
STEP 9. Measure the ground voltage at auto-cruise control switch connector C-203 by backprobing.

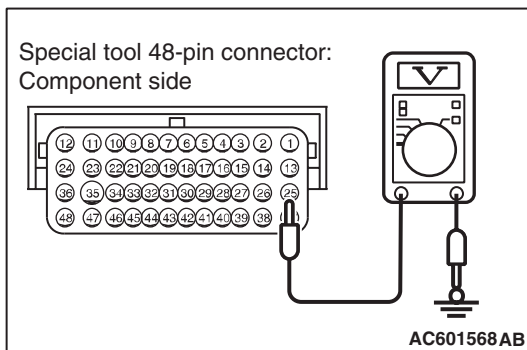
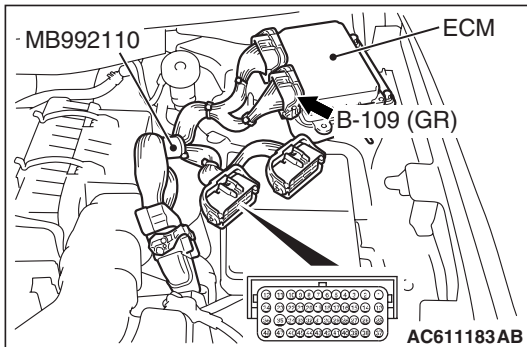
- (1) Do not disconnect auto-cruise control switch connector C-203.
- (2) Turn the ignition switch to the "ON" position.
- (3) Turn the "ON/OFF" (MAIN) switch to the "ON" position.
- (4) Measure the ground voltage between auto-cruise control switch connector C-203 terminal 2 and ground by backprobing.
- (5) Turn the "ON/OFF" (MAIN) switch to the "OFF" position.
- (6) Turn the ignition switch to the "LOCK" (OFF) position.

Q: Is the measured voltage 0.52 volt or less?

YES : Go to Step 15.

NO : Go to Step 10.



**STEP 10. Measure the ground voltage at ECM connector B-109.**

- (1) Remove the ECM [Refer to GROUP 13A, Engine Control Module (ECM) [P.13A-952](#)].
- (2) Connect special tool MB992110 between the ECM and the body-side harness connector.
- (3) Turn the ignition switch to the "ON" position.
- (4) Turn the "ON/OFF" (MAIN) switch to the "ON" position.

- (5) Measure the ground voltage between special tool 48-pin connector terminal 25 (ECM connector B-109 terminal 95) and ground.
- (6) Turn the "ON/OFF" (MAIN) switch to the "OFF" position.
- (7) Turn the ignition switch to the "LOCK" (OFF) position.
- (8) Disconnect special tool MB992110 between the ECM and the body-side harness connector.
- (9) Install the ECM [Refer to GROUP 13A, Engine Control Module (ECM) [P.13A-952](#)].

Q: Is the measured voltage 0.3 volt or less?

YES : Go to Step 12.

NO : Go to Step 11.

STEP 11. Check ECM connector B-109 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connector and terminals in good condition?

YES : Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 17.

NO : Repair or replace the faulty connector (Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#)). Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 19.

STEP 12. Check ECM connector B-109, intermediate connector C-127, auto-cruise control switch connector C-203 and clock spring connectors C-204 and C-205 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

Q: Are the connectors and terminals in good condition?

YES : Go to Step 13.

NO : Repair or replace the faulty connector (Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#)). Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 19.

STEP 13. Check the clock spring.

Refer to GROUP 52B, Air Bag Modules and Clock Spring Inspection [P.52B-375](#).

Q: Is the clock spring in good condition?

YES : Go to Step 14.

NO : Replace the clock spring (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 19.

STEP 14. Check the harness wire between ECM connector B-109 terminal 95 and auto-cruise control switch connector C-203 terminal 2 for damage.

Q: Are the harness wires in good condition?

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunction [P.00-13](#)). Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 19.

NO : Repair the damaged harness wire. Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 19.

STEP 15. Check auto-cruise control switch connector C-203 for loose, corroded or damaged terminals, or terminals pushed back in the connector.

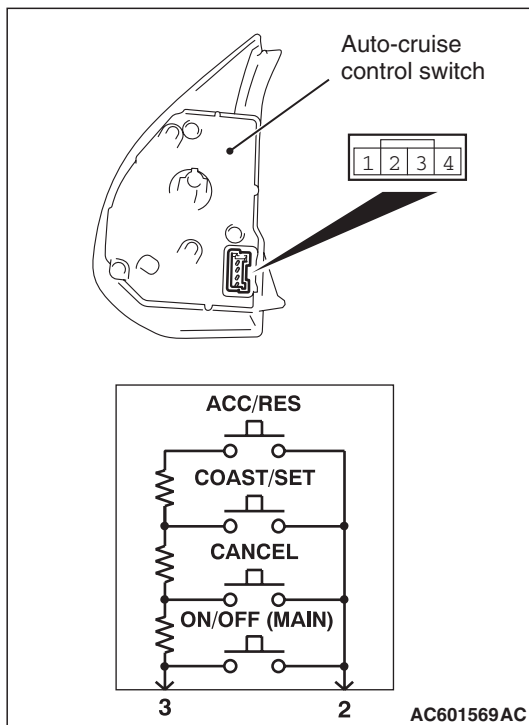
Q: Are the connector and terminals in good condition?

YES : Go to Step 16.

NO : Repair or replace the faulty connector (Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#)). Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 19.

STEP 16. Check the auto-cruise control switch.

- (1) Remove the auto-cruise control switch (Refer to [P.17-69](#)).
- (2) Measure the resistance between terminal 2 and terminal 3 when each of the "ON/OFF" (MAIN), "COAST/SET", "ACC/RES" and "CANCEL" switch is pressed.



Switch position	Specified condition
All switches are OFF.	Open circuit
"ON/OFF" (MAIN) switch is "ON".	Continuity (less than 2 ohms)
"CANCEL" switch is ON.	202.5 - 208 Ω
"COAST/SET" switch is ON.	610.5 - 624.5 Ω
"ACC/RES" switch is ON.	1838 - 1877 Ω

Q: Is the resistance within specifications?

YES : Install the auto-cruise control switch (Refer to [P.17-69](#)) and the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 17.

NO : Replace the auto-cruise control switch (Refer to [P.17-69](#)). Install the air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#)). Then go to Step 19.

STEP 17. Using scan tool MB991958, check data list item 75: Cancel switch, item 86: Main switch, item 91: Resume switch and item 92: Set switch.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to [P.17-11](#)).
 - Item 75: Cancel switch.
 - When "CANCEL" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "CANCEL" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
 - Item 86: Main switch.
 - When "ON/OFF" (MAIN) switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "ON/OFF" (MAIN) switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
 - Item 91: Resume switch.
 - When "ACC/RES" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "ACC/RES" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
 - Item 92: Set switch.
 - When "COAST/SET" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "COAST/SET" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 18.

NO : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 19.

STEP 18. Read the diagnostic trouble code.

- (1) Disconnect the negative (-) battery terminal, to erase the diagnostic trouble code of the auto-cruise control system.
- (2) Connect the negative (-) battery terminal.
- (3) Turn the ignition switch to the "ON" position, and press the "ON/OFF" (MAIN) switch to turn the auto-cruise control system to ON (turn on the "CRUISE" indicator light).
- (4) After turning the auto-cruise control system to ON, when 2 minutes or more has elapsed without operating the auto-cruise control switches, read the diagnostic trouble code of the auto-cruise control system (Refer to [P.17-11](#)).

Q: Is DTC 15 set?

YES : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 19.

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunction [P.00-13](#)).

STEP 19. Using scan tool MB991958, check data list item 75: Cancel switch, item 86: Main switch, item 91: Resume switch and item 92: Set switch.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to [P.17-11](#)).
 - Item 75: Cancel switch.
 - When "CANCEL" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "CANCEL" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
 - Item 86: Main switch.
 - When "ON/OFF" (MAIN) switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "ON/OFF" (MAIN) switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
 - Item 91: Resume switch.
 - When "ACC/RES" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "ACC/RES" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
 - Item 92: Set switch.
 - When "COAST/SET" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "COAST/SET" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 20.

NO : Return to Step 2.

STEP 20. Read the diagnostic trouble code.

- (1) Disconnect the negative (-) battery terminal, to erase the diagnostic trouble code of the auto-cruise control system.
- (2) Connect the negative (-) battery terminal.
- (3) Turn the ignition switch to the "ON" position, and press the "ON/OFF" (MAIN) switch to turn the auto-cruise control system to ON (turn on the "CRUISE" indicator light).
- (4) After turning the auto-cruise control system to ON, when 2 minutes or more has elapsed without operating the auto-cruise control switches, read the diagnostic trouble code of the auto-cruise control system (Refer to [P.17-11](#)).

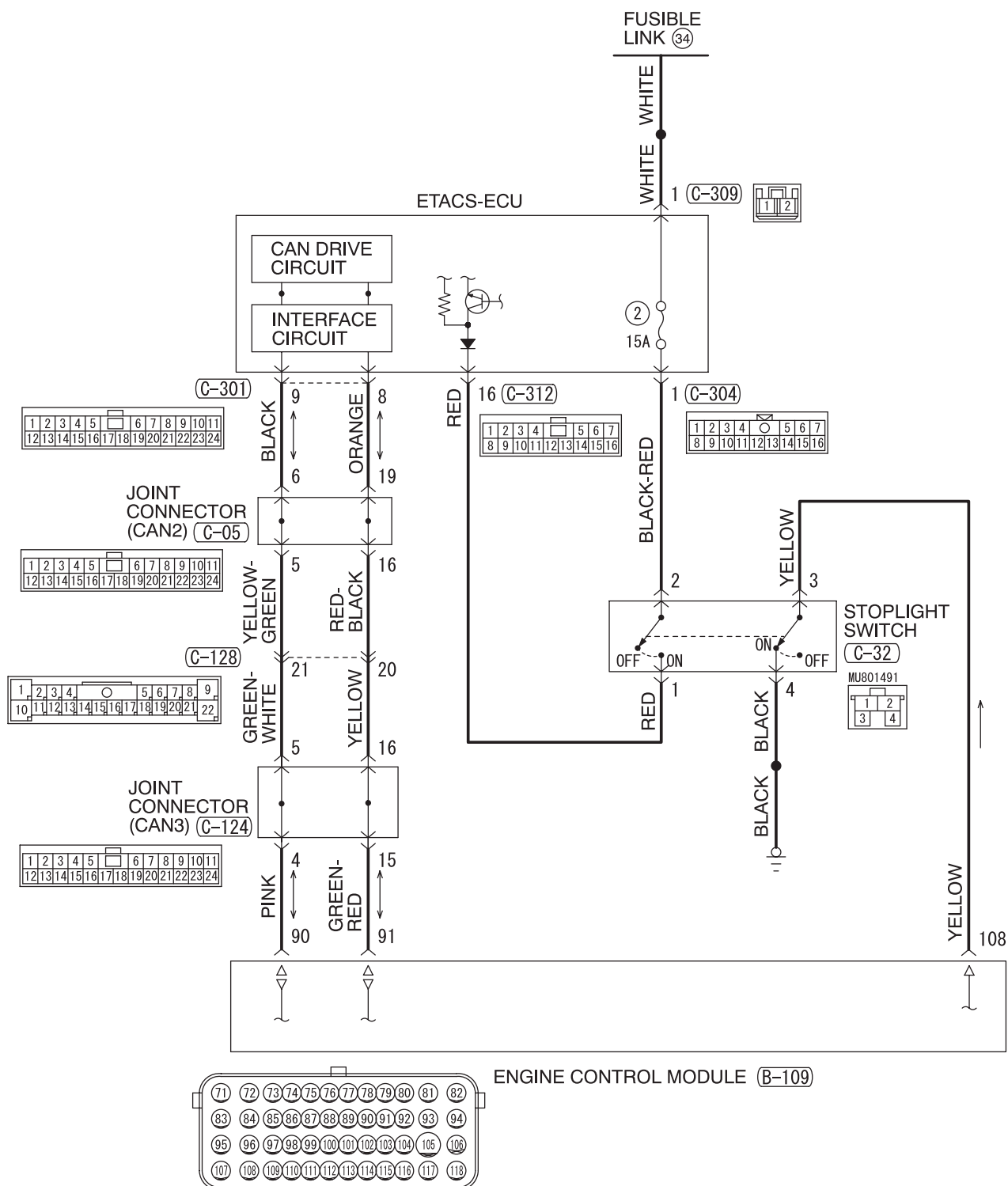
Q: Is DTC 15 set?

YES : Return to Step 1.

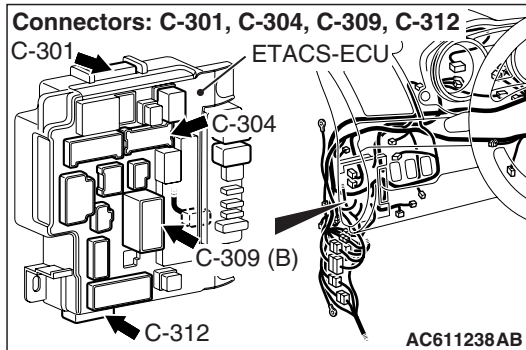
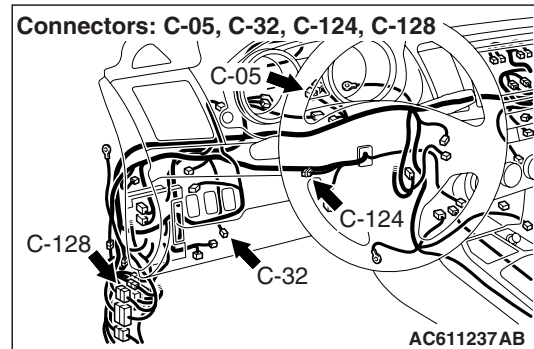
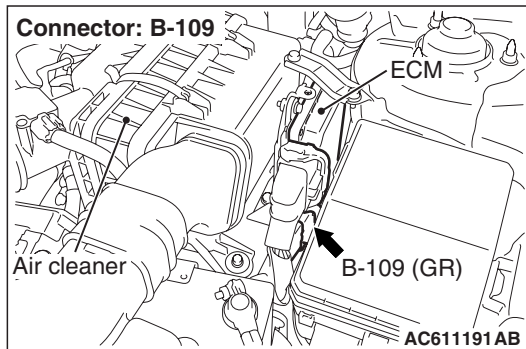
NO : The procedure is complete.

DTC 22: Stoplight Switch System

Stoplight Switch System Circuit



AC611236AB



CIRCUIT OPERATION

- As for the brake light switch, when the brake pedal is depressed, the signal is transmitted from the ETACS-ECU to the ECM via CAN bus line.
- As for the normally closed brake switch, when the brake pedal is depressed, battery positive voltage is supplied to the stoplight switch (terminal 3), and when the brake pedal is not depressed, the voltage of ECM terminal 108 will indicate 0 volt.

DTC SET CONDITIONS

Check Condition

- The "CRUISE" indicator light illuminates.

Judgement Criteria

- Open/short in stop light switch circuit.
- Open circuit in the brake switch circuit (between ECM terminal 108 and ground).
- Malfunction of CAN bus line.

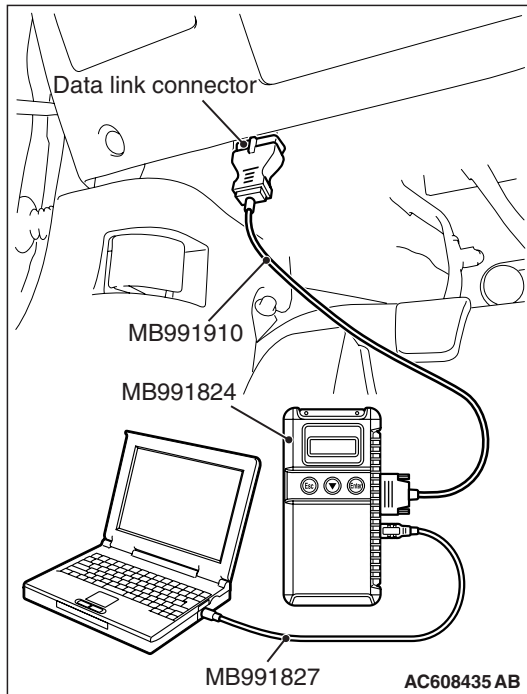
TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of CAN bus system.
- Damaged harness or connector.
- Malfunction of the stoplight switch.
- Malfunction of the ETACS-ECU
- Malfunction of the ECM

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: M.U.T.-III USB Cable
 - MB991910: M.U.T.-III Main Harness A
- MB991223: Harness Set
- MB992006: Extra Fine Probe



STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector (Refer to P.17-11).
- (2) Turn the ignition switch to the "ON" position.
- (3) Diagnose the CAN bus line (Refer to P.17-11).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the check result satisfactory?

YES : Go to Step 2

NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis –Can Bus Diagnostic Chart P.54C-16). Then go to Step 15.

STEP 2. Using scan tool MB991958, check data list item 74: Brake light switch.

- (1) Connect scan tool MB991958 to the data link connector (Refer to P.17-11).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to P.17-11).
 - Item 74: Brake light switch.
 - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 9.

NO : Go to Step 3.

STEP 3. Using scan tool MB991958, check ETACS system data list item 290: Brake light switch.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for ETACS system (Refer to GROUP 54A, ETACS –Data List Reference Table [P.54A-522](#)).
 - Item 290: Brake light switch.
 - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 15.

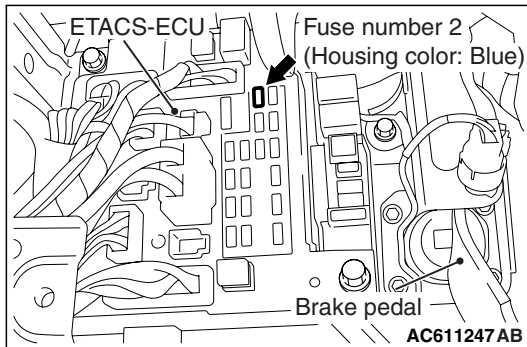
NO : Go to Step 4.

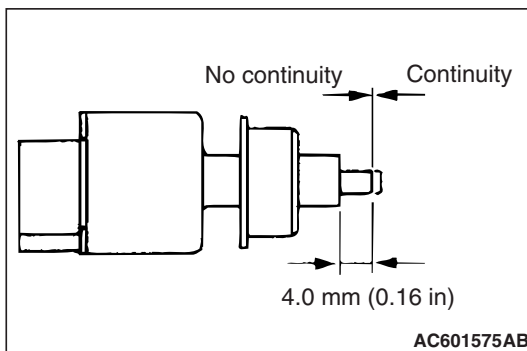
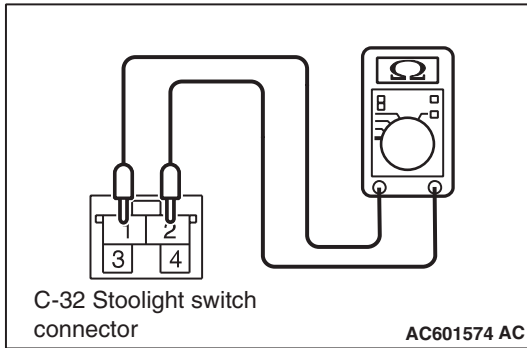
STEP 4. Check fuse number 2 at the ETACS-ECU.

Q: Is the fuse in good condition?

YES : Go to Step 5.

NO : Check the stoplight system harness and replace the fuse. Then go to Step 15.



**STEP 5. Check the stoplight switch.**

- (1) Remove the stoplight switch (Refer to GROUP 35A, Brake Pedal [P.35A-34](#)).
- (2) Connect an ohmmeter to the stoplight switch between terminals 1 and 2.
- (3) Check for continuity between the terminals when the plunger of the stoplight switch is pushed in and when it is released.
- (4) The stoplight switch is operating properly if the circuit is open between terminals 1 and 2 when the plunger is pushed in to a depth of within 4.0 mm (0.16 inch) from the outer case edge surface, and if the resistance value is less than 2 ohms between terminals 1 and 2 when it is released.

Q: Is the stoplight switch operating properly?

YES : Install the stoplight switch (Refer to GROUP 35A, Brake Pedal [P.35A-34](#)). Then go to Step 6.

NO : Replace the stoplight switch (Refer to GROUP 35A, Brake Pedal [P.35A-34](#)). Then go to Step 15.

STEP 6. Check stoplight switch connector C-32 and ETACS-ECU connector C-304 and C-312 for loose, corroded or damaged terminals, or terminals pushed back in the connector.**Q: Are the connectors and terminals in good condition?**

YES : Go to Step 7.

NO : Repair or replace the damaged components (Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#)). Then go to Step 15.

STEP 7. Check the harness wire between ETACS-ECU connector C-304 terminal 1 and ETACS-ECU connector C-312 terminal 16 for damage.**Q: Is the harness wire in good condition?**

YES : Go to Step 8.

NO : Repair the damaged harness wire. Then go to Step 15.

STEP 8. Using scan tool MB991958, check ETACS system data list item 290: Brake light switch.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for ETACS system (Refer to GROUP 54A, ETACS –Data List Reference Table [P.54A-522](#)).
 - Item 290: Brake light switch.
 - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 9.

NO : Replace the ETACS-ECU (Refer to GROUP 54A, ETACS-ECU [P.54A-564](#)). Then go to Step 15.

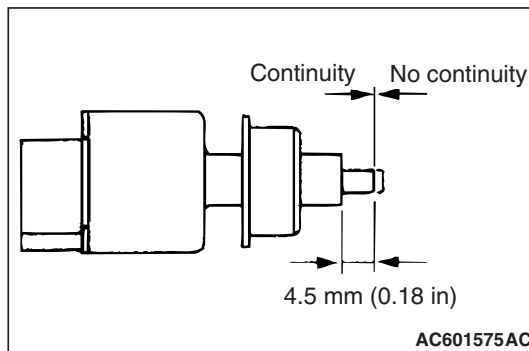
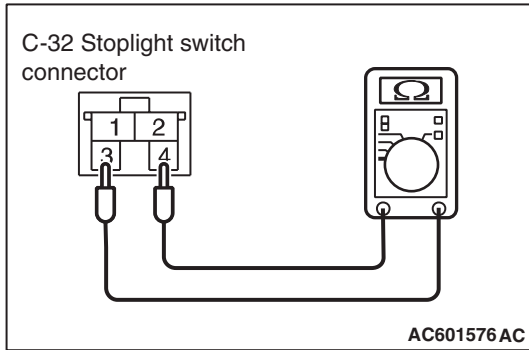
STEP 9. Using scan tool MB991958, check data list item 89: Normally closed brake switch.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to [P.17-11](#)).
 - Item 89: Normally closed brake switch.
 - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 14.

NO : Go to Step 10.

**STEP 10. Check the stoplight switch.**

- (1) Remove the stoplight switch (Refer to GROUP 35A, Brake Pedal [P.35A-34](#)).
- (2) Connect an ohmmeter to the stoplight switch between terminals 3 and 4.
- (3) Check for continuity between the terminals when the plunger of the stoplight switch is pushed in and when it is released.
- (4) The stoplight switch is operating properly if the circuit is open between terminals 3 and 4 when the plunger is released, and if resistance value is less than 2 ohms between terminals 3 and 4 when the plunger is pushed in to a depth of within 4.5 mm (0.18 inch) from the outer case edge surface.

Q: Is the stoplight switch operating properly?

YES : Install the stoplight switch (Refer to GROUP 35A, Brake Pedal [P.35A-34](#)). Then go to Step 11.

NO : Replace the stoplight switch (Refer to GROUP 35A, Brake Pedal [P.35A-34](#)). Then go to Step 15.

STEP 11. Check ECM connector B-109 and stoplight switch connector C-32 for loose, corroded or damaged terminals, or terminals pushed back in the connector.**Q: Are the connectors and terminals in good condition?**

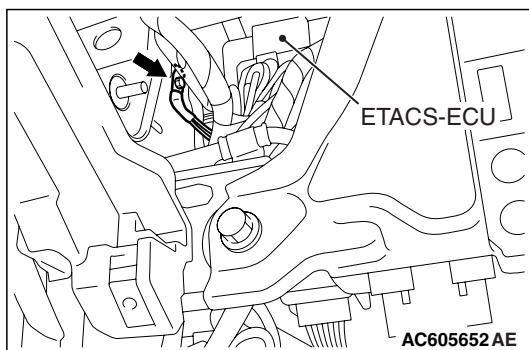
YES : Go to Step 12.

NO : Repair or replace the damaged components (Refer to GROUP 00E, Harness Connector Inspection [P.00E-2](#)). Then go to Step 15.

STEP 12. Check the harness wire between ECM connector B-109 terminal 108 and ground for damage.**Q: Is the harness wire in good condition?**

YES : Go to Step 13.

NO : Repair the damaged harness wire. Then go to Step 15.



STEP 13. Using scan tool MB991958, check data list item 89: Normally closed brake switch.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to [P.17-11](#)).
 - Item 89: Normally closed brake switch.
 - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunction [P.00-13](#)). Then go to Step 15.

NO : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 15.

STEP 14. Read the diagnostic trouble codes.

- (1) Disconnect the negative (–) battery terminal, to erase the diagnostic trouble code of the auto-cruise control system.
- (2) Connect the negative (–) battery cable.
- (3) Turn the ignition switch to the "ON" position, and press the "ON/OFF" (MAIN) switch to turn the auto-cruise control system to ON (turn on the "CRUISE" indicator light).
- (4) With the auto-cruise control switches not operated, depress the brake pedal for several seconds, and then read the diagnosis code of the auto-cruise control system (Refer to [P.17-11](#)).

Q: Is DTC 22 set?

YES : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 15.

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunction [P.00-13](#)). Then go to Step 15.

STEP 15. Using scan tool MB991958, check data list item 74: Brake light switch and item 89: Normally closed brake switch.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to [P.17-11](#)).
 - Item 74: Brake light switch.
 - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".
 - Item 89: Normally closed brake switch.
 - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?**YES :** Go to Step 16**NO :** Return to Step 2.

STEP 16. Read the diagnostic trouble codes.

- (1) Disconnect the negative (-) battery terminal, and erase the diagnostic trouble code of the auto-cruise control system.
- (2) Connect the negative (-) battery cable.
- (3) Turn the ignition switch to the "ON" position, and press the "ON/OFF" (MAIN) switch to turn the auto-cruise control system to ON (turn on the "CRUISE" indicator light).
- (4) With the auto-cruise control switches not operated, depress the brake pedal for several seconds, and then read the diagnosis code of the auto-cruise control system (Refer to [P.17-11](#)).

Q: Is DTC 22 set?**YES :** Return to Step 1.**NO :** The procedure is complete.

DTC 23: ECM and Its Related Component

DTC SET CONDITIONS

This DTC is set when there is a failure in the ECM and its related components.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the MFI system.
- Malfunction of the ECM.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: M.U.T.-III USB Cable
 - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, check for MFI system diagnostic trouble code.

CAUTION

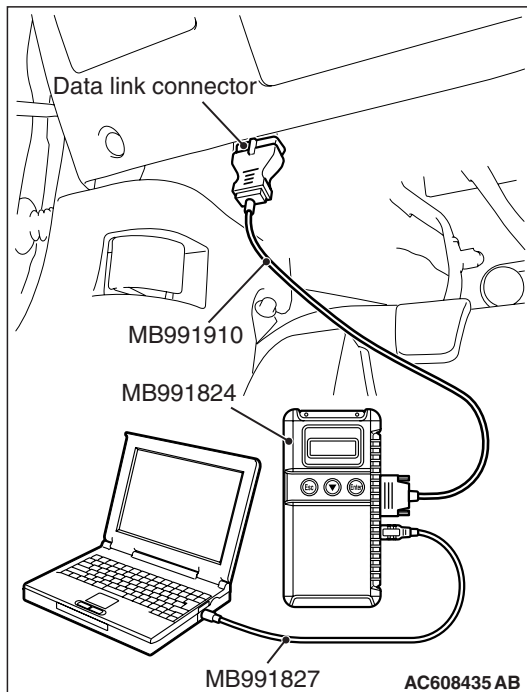
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector (Refer to P.17-11).
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for MFI system diagnostic trouble code (Refer to GROUP 13A, MFI Diagnosis –Diagnostic Function P.13A-10).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is any DTC set?

YES : Diagnose the MFI system (Refer to GROUP 13A, MFI Diagnosis –Diagnostic Trouble Code Chart P.13A-46). Then go to Step 3.

NO : Go to Step 2.



STEP 2. Read the auto-cruise control system diagnostic trouble code.

- (1) Disconnect the negative (-) battery terminal, to erase the diagnostic trouble code of the auto-cruise control system.
- (2) Connect the negative (-) battery terminal.
- (3) Turn the ignition switch to the "ON" position, and press the "ON/OFF" (MAIN) switch to turn the auto-cruise control system to ON (turn on the "CRUISE" indicator light).
- (4) Read the diagnostic trouble code of the auto-cruise control system (Refer to [P.17-11](#)).

Q: Is DTC 23 set?

YES : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 3.

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunction [P.00-13](#)).

STEP 3. Read the auto-cruise control system diagnostic trouble code.

- (1) Disconnect the negative (-) battery terminal, to erase the diagnostic trouble code of the auto-cruise control system.
- (2) Connect the negative (-) battery terminal.
- (3) Turn the ignition switch to the "ON" position, and press the "ON/OFF" (MAIN) switch to turn the auto-cruise control system to ON (turn on the "CRUISE" indicator light).
- (4) Read the diagnostic trouble code of the auto-cruise control system (Refer to [P.17-11](#)).

Q: Is DTC 23 set?

YES : Return to Step 1.

NO : The procedure is complete.

SYMPTOM CHART

M1172002300816

Symptom		Inspection procedure number	Reference page
Communication with scan tool is not possible	Communication with the ECM only is impossible	–	GROUP 13A, MFI Diagnosis – Symptom Procedures – Inspection Procedure 1 P.13A-791
Auto-cruise control is not cancelled.	When brake pedal is depressed	1	P.17-37
	When clutch pedal is depressed <M/T>	2	P.17-39
	When selector lever is moved to "N" position <CVT>	3	P.17-43
	When "CANCEL" switch is turned ON	4	P.17-45
"COAST/SET" or "ACC/RES" switch operation is not available.		5	P.17-46
Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed. <M/T>		6	P.17-51
Hunting (repeated acceleration and deceleration) occurs at the set vehicle speed. <CVT>		7	P.17-53
When "ON/OFF" (MAIN) switch is turned ON, "CRUISE" indicator light inside combination meter does not illuminate. (However, auto-cruise control system is normal).		8	P.17-55

SYMPTOM PROCEDURES

INSPECTION PROCEDURE 1: When the Brake Pedal is Depressed, Auto-cruise Control System is not Cancelled.

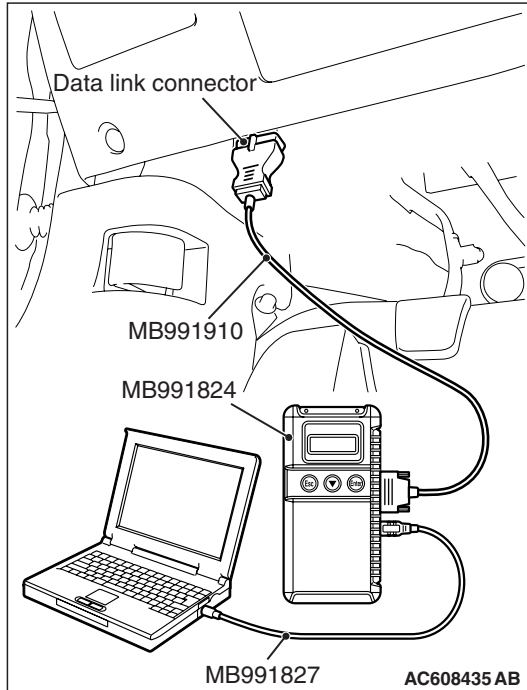
COMMENT

The stoplight switch circuit is suspected.

- Damaged harness or connector.
- Malfunction of the stoplight switch.
- Malfunction of the ETACS-ECU
- Malfunction of the ECM.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of CAN bus system.

DIAGNOSIS

STEP 1. Using scan tool MB991958, check data list item 74: Brake light switch and item 89: Normally closed brake switch.

⚠ CAUTION

To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector (Refer to P.17-11).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to P.17-11).
 - Item 74: Brake light switch.
 - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".
 - Item 89: Normally closed brake switch.
 - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 2

NO : Refer to P.17-26, Diagnostic Trouble Code Procedures –DTC 22: Stoplight Switch System. Then go to Step 3.

STEP 2. Check the symptoms.

Q: When the brake pedal is depressed, auto-cruise control system is cancelled?

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunction P.00-13).

NO : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table P.42C-8). Then go to Step 3.

STEP 3. Check the symptoms.

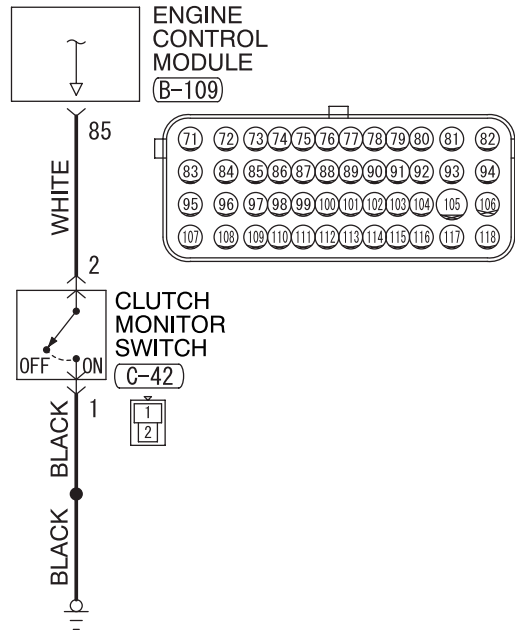
Q: When the brake pedal is depressed, auto-cruise control system is cancelled?

YES : The procedure is complete.

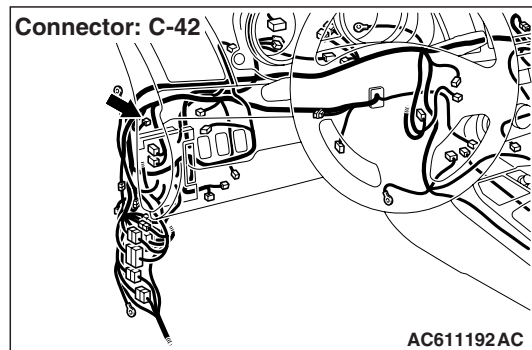
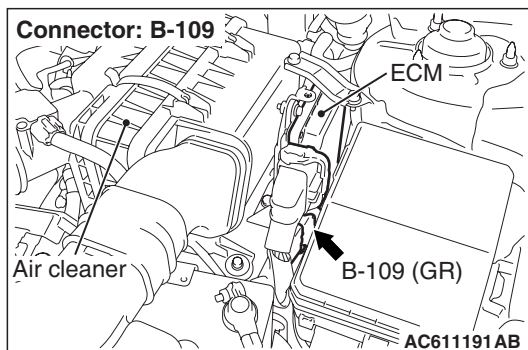
NO : Return to Step 1.

INSPECTION PROCEDURE 2: When the Clutch Pedal is Depressed, Auto-cruise Control System is not Cancelled <M/T>.

Clutch Switch System Circuit



AC611251AB



CIRCUIT OPERATION

This circuit indicates the operation status of the clutch switch. When the clutch switch is ON (clutch pedal is depressed), the voltage of ECM terminal 42 will indicate 0 volt.

COMMENT

The cause is probably a malfunction of the clutch switch circuit.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Damaged harness or connector.
- Malfunction of the clutch switch.
- Malfunction of the ECM

DIAGNOSIS**Required Special Tools:**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: M.U.T.-III USB Cable
 - MB991910: M.U.T.-III Main Harness A
- MB991223: Harness Set
- MB992006: Extra Fine Probe

STEP 1. Using scan tool MB991958, check data list item 78: Clutch switch.**⚠ CAUTION**

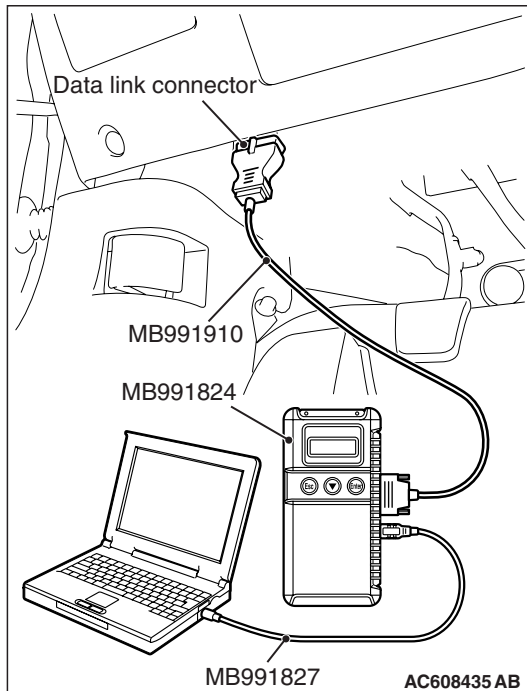
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector (Refer to P.17-11).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to P.17-11).
 - Item 78: Clutch switch.
 - When the clutch pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the clutch pedal is released, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 7.

NO : Go to Step 2.

**STEP 2. Check ECM connector B-109 and clutch switch connector C-42 for loose, corroded or damaged terminals, or terminals pushed back in the connector.****Q: Are the connectors and terminals in good condition?**

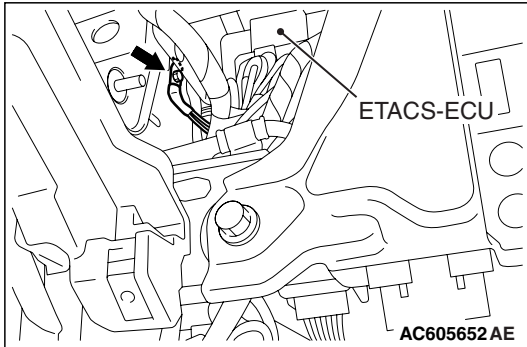
YES : Go to Step 3.

NO : Repair or replace the faulty connector (Refer to GROUP 00E, Harness Connector Inspection P.00E-2). Then go to Step 8.

STEP 3. Check the harness wire between ECM connector B-109 terminal 85 and clutch switch connector C-42 terminal 2 for damage.**Q: Is the harness wires in good condition?**

YES : Go to Step 4.

NO : Repair the damaged harness wire. Then go to Step 8.

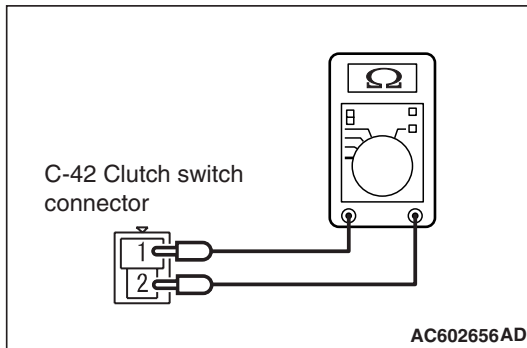


STEP 4. Check the harness wire between clutch switch connector C-42 terminal 1 and ground for damage.

Q: Is the harness wire in good condition?

YES : Go to Step 5.

NO : Repair the damaged harness wire. Then go to Step 8.



STEP 5. Check the clutch switch.

(1) Disconnect clutch switch connector C-42.

(2) Measure the continuity between the terminals.

Measurement condition	Terminal connector of tester	Specified condition
When clutch pedal is depressed.	1 -2	Continuity (less than 2 ohms)
When clutch pedal is not depressed.	1 -2	Open circuit

(3) Connect clutch switch connector C-42.

Q: Is the clutch switch operating properly?

YES : Go to Step 6.

NO : Replace the clutch switch (Refer to GROUP 21A, Clutch Pedal and Master Cylinder [P.21A-4](#)). Then go to Step 8.

STEP 6. Using scan tool MB991958, check data list item 78: Clutch switch.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to [P.17-11](#)).
 - Item 78, Clutch switch.
 - When the clutch pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the clutch pedal is released, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 7.

NO : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 8.

STEP 7. Check the symptoms.**Q: When the brake pedal is depressed, auto-cruise control system is cancelled?**

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points - How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 8.

STEP 8. Check the symptoms.**Q: When the clutch pedal is depressed, auto-cruise control system is cancelled?**

YES : The procedure is complete.

NO : Return to Step 1.

INSPECTION PROCEDURE 3: When the Selector Lever is Moved to "N" Position, Auto-cruise Control System is not Cancelled <CVT>.

CIRCUIT OPERATION

When the selector lever is in the "N" position, the signal is transmitted from the TCM to the ECM via CAN bus line.

COMMENT

- Malfunction of CAN bus line.
- Malfunction of CVT system.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of CAN bus system.
- Damaged harness or connector.
- Malfunction of the transmission range switch.
- Malfunction of the TCM.
- Malfunction of the ECM.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: M.U.T.-III USB Cable
 - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

⚠ CAUTION

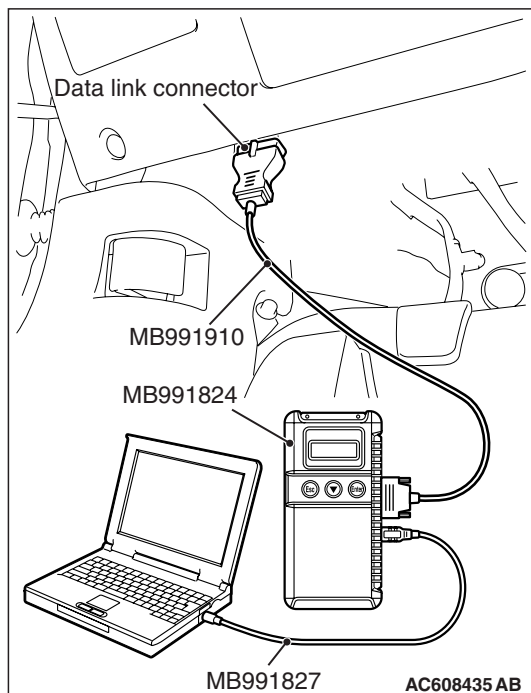
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector (Refer to P.17-11).
- (2) Turn the ignition switch to the "ON" position.
- (3) Diagnose the CAN bus line (Refer to P.17-11).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the check result satisfactory?

YES : Go to Step 2

NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis –Can Bus Diagnostic Chart P.54C-16). Then go to Step 5.



STEP 2. Using scan tool MB991958, check the CVT system data list item 49: Transmission range switch.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for CVT system (Refer to GROUP 23A, Diagnosis, Diagnostic Function [P.23A-14](#)).
 - Item 49: Transmission range switch.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 3.

NO : Diagnose the CVT system (Refer to GROUP 23A, Diagnosis –Diagnostic Trouble Code Procedures – DTC P0705: Malfunction of Transmission Range Switch [P.23A-35](#)). Then go to Step 5.

STEP 3. Using scan tool MB991958, read the CVT system diagnostic trouble code.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for CVT system diagnostic trouble code (Refer to GROUP 23A, Diagnosis –Diagnostic Function [P.23A-14](#)).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is any DTC set?

YES : Diagnose the CVT system (Refer to GROUP 23A, Diagnosis –Diagnostic Trouble Code Chart [P.23A-29](#)). Then go to Step 5.

NO : Go to Step 4.

STEP 4. Check the symptoms.**Q: When the selector lever is moved to "N" position, auto-cruise control system is cancelled?**

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 5.

STEP 5. Check the symptoms.**Q: When the selector lever is moved to "N" position, auto-cruise control system is cancelled?**

YES : The procedure is complete.

NO : Return to Step 1.

INSPECTION PROCEDURE 4: When the Auto-cruise Control "CANCEL" Switch is Set to ON, Auto-cruise Control System is not Cancelled.

COMMENT

The cause is probably an open-circuit in the output circuit inside the "CANCEL" switch.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the auto-cruise control switch.
- Malfunction of the ECM.

DIAGNOSIS PROCEDURE

STEP 1. Check for diagnostic trouble code.

Read the diagnostic trouble code of the auto-cruise control system (Refer to [P.17-11](#)).

Q: Is DTC 15 set?

YES : Refer to [P.17-14](#), Diagnostic Trouble Code Procedures –DTC P15: Auto-cruise Control Switch System. Then go to Step 3.

NO : Go to Step 2.

STEP 2. Retest the system.

Q: Does the auto-cruise control "CANCEL" switch set to ON, auto-cruise control system is cancelled?

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 3.

STEP 3. Retest the system.

Q: Does the auto-cruise control "CANCEL" switch set to ON, auto-cruise control system is cancelled?

YES : The procedure is complete.

NO : Return to Step 1.

INSPECTION PROCEDURE 5: "COAST/SET" or "ACC/RES" Switch Operation is not Available.**COMMENT**

The fail-safe function is probably canceling auto-cruise control system. In this case, checking the auto-cruise control system, MFI system, CVT system and CAN bus line system diagnostic trouble codes. The scan tool MB991958 can also be used to check if the circuits of each input switch are normal or not by checking the input switch codes.

NOTE: Press the auto-cruise control switches one by one securely. Otherwise, the auto-cruise control system may not be started.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the CAN bus line system.
- Malfunction of the MFI system.
- Malfunction of the CVT system <CVT>.
- Malfunction of the auto-cruise control switch.
- Malfunction of the stoplight switch.
- Malfunction of the clutch switch <M/T>.
- Malfunction of the transmission range switch <CVT>.
- Malfunction of the TCM <CVT>.
- Malfunction of the ECM.

DIAGNOSIS**Required Special Tools:**

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: M.U.T.-III USB Cable
 - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.**⚠ CAUTION**

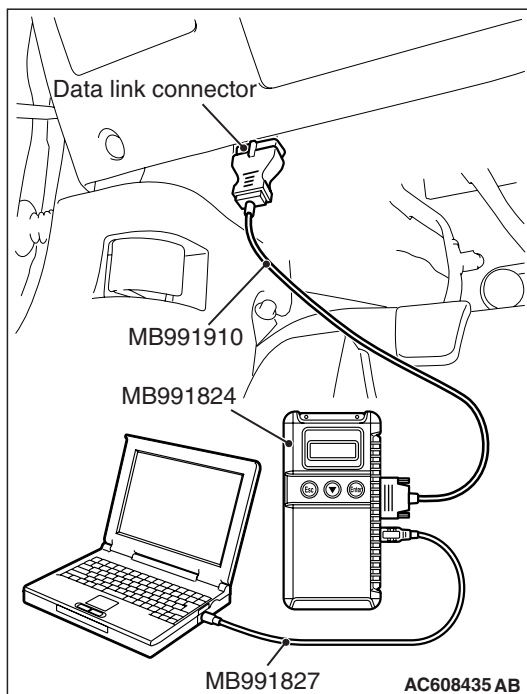
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector (Refer to P.17-11).
- (2) Turn the ignition switch to the "ON" position.
- (3) Diagnose the CAN bus line (Refer to P.17-11).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the check result satisfactory?

YES : Go to Step 2

NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis –Can Bus Diagnostic Chart P.54C-16). Then go to Step 10.



STEP 2. Using scan tool MB991958, check for MFI system diagnostic trouble code.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for MFI system diagnostic trouble code (Refer to GROUP 13A, Diagnosis –Diagnostic Function [P.13A-10](#)).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is any DTC set?

YES : Diagnose the MFI system (Refer to GROUP 13A, Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#)). Then go to Step 10.

NO : Go to Step 4 <M/T>.

NO : Go to Step 3 <CVT>.

STEP 3. Using scan tool MB991958, check for CVT system diagnostic trouble code <CVT>.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for CVT system diagnostic trouble code (Refer to GROUP 23A, Diagnosis –Diagnostic Function [P.23A-14](#)).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is any DTC set?

YES : Diagnose the CVT system (Refer to GROUP 23A, Diagnosis –Diagnostic Trouble Code Chart [P.23A-29](#)). Then go to Step 10.

NO : Go to Step 4.

STEP 4. Check for diagnostic trouble code.

Read the auto-cruise control system diagnostic trouble code (Refer to [P.17-11](#)).

Q: Is DTC set?

YES : Diagnose the auto-cruise control system (Refer to [P.17-13](#), Diagnostic Trouble Code Chart). Then go to Step 10.

NO : Go to Step 5.

STEP 5. Using scan tool MB991958, check data list item 75: Cancel switch, item 86: Main switch, item 91: Resume switch and item 92: Set switch.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to [P.17-11](#)).
 - Item 75: Cancel switch.
 - When "CANCEL" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "CANCEL" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
 - Item 86: Main switch.
 - When "ON/OFF" (MAIN) switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "ON/OFF" (MAIN) switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
 - Item 91: Resume switch.
 - When "ACC/RES" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "ACC/RES" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
 - Item 92: Set switch.
 - When "COAST/SET" switch is at the "ON" position, the display on scan tool MB991958 should be "ON".
 - When "COAST/SET" switch is at the "OFF" position, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?**YES** : Go to Step 6.**NO** : Refer to [P.17-14](#), Diagnostic Trouble Code Procedures –DTC P15: Auto-cruise Control Switch System. Then go to Step 10.

STEP 6. Using scan tool MB991958, check data list item 74: Brake light switch and item 89: Normally closed brake switch.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to [P.17-11](#)).
 - Item 74: Brake light switch.
 - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".
 - Item 89: Normally closed brake switch.
 - When the brake pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the brake pedal is released, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 7 <M/T>.

YES : Go to Step 8 <CVT>.

NO : Refer to [P.17-26](#), Diagnostic Trouble Code Procedures –DTC P22: Stoplight Switch System. Then go to Step 10.

STEP 7. Using scan tool MB991958, check data list item 78: Clutch switch <M/T>.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to [P.17-11](#)).
 - Item 78: Clutch switch.
 - When the clutch pedal is depressed, the display on scan tool MB991958 should be "ON".
 - When the clutch pedal is released, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 9.

NO : Refer to [P.17-39](#), Symptom Procedures –Inspection Procedure 2. Then go to Step 10.

STEP 8. Using scan tool MB991958, check data list item 87: Neutral switch <CVT>.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to [P.17-11](#)).
 - Item 87: Neutral switch.
 - When selector lever is at the "N" position, the display on scan tool MB991958 should be "ON".
 - When selector lever is other than "N" position, the display on scan tool MB991958 should be "OFF".
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the switch operating properly?

YES : Go to Step 9.

NO : Refer to [P.17-43](#), Symptom Procedures –Inspection Procedure 3. Then go to Step 10.

STEP 9. Check the symptoms.**Q: Is the "COAST/SET" or "ACC/REST" switch operation available?**

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 10.

STEP 10. Check the symptoms.**Q: Is the "COAST/SET" or "ACC/REST" switch operation available?**

YES : The procedure is complete.

NO : Return to Step 1.

INSPECTION PROCEDURE 6: Hunting (Repeated Acceleration and Deceleration) Occurs at the Set Vehicle Speed <M/T>.

COMMENT

The vehicle speed sensor or the throttle body is suspected.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the vehicle speed sensor.
- Malfunction of the throttle body.
- Malfunction of the MFI system
- Malfunction of the ECM.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: M.U.T.-III USB Cable
 - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, check for MFI system diagnostic trouble code.

⚠ CAUTION

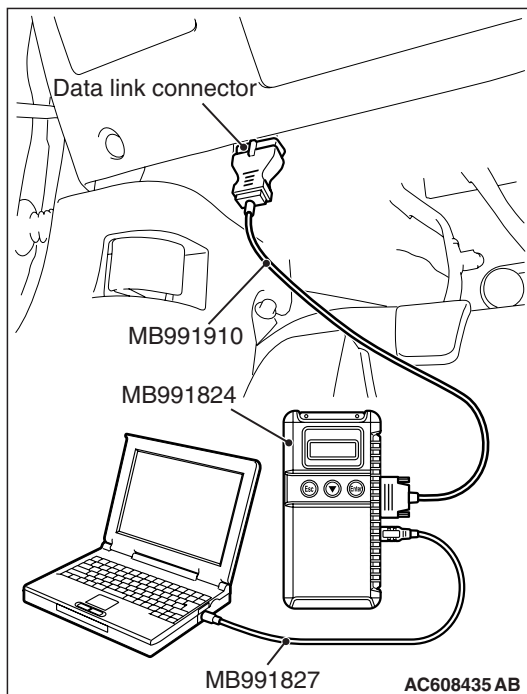
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector (Refer to P.17-11).
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for MFI system diagnostic trouble code (Refer to GROUP 13A, Diagnosis –Diagnostic Function P.13A-10).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is any DTC set?

YES : Diagnose the MFI system (Refer to GROUP 13A, Diagnosis –Diagnostic Trouble Code Chart P.13A-46). Then go to Step 4.

NO : Go to Step 2.



STEP 2. Using scan tool MB991958, check data list item 04: Vehicle speed sensor.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for auto-cruise control system (Refer to [P.17-11](#)).
 - Item 04: Vehicle speed sensor.
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the vehicle speed sensor operating properly?

YES : Go to Step 3.

NO : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 4.

STEP 3. Retest the system**Q: Does hunting occur?**

YES : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Necessity Judgment Table [P.42C-98](#)). Then go to Step 4.

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunction [P.00-13](#)).

STEP 4. Retest the system**Q: Does hunting occur?**

YES : Return to Step 1.

NO : The procedure is complete.

INSPECTION PROCEDURE 7: Hunting (Repeated Acceleration and Deceleration) Occurs at the Set Vehicle Speed <CVT>.

COMMENT

The secondary pulley speed sensor signal or the throttle body is suspected.

- Malfunction of the secondary pulley speed sensor.
- Malfunction of the throttle body.
- Malfunction of the TCM.
- Malfunction of the ECM.

TROUBLESHOOTING HINTS (The most likely causes for this case:)

- Malfunction of the CAN bus line system.

DIAGNOSIS

Required Special Tools:

- MB991958: Scan Tool (M.U.T.-III Sub Assembly)
 - MB991824: V.C.I.
 - MB991827: M.U.T.-III USB Cable
 - MB991910: M.U.T.-III Main Harness A

STEP 1. Using scan tool MB991958, diagnose the CAN bus line.

⚠ CAUTION

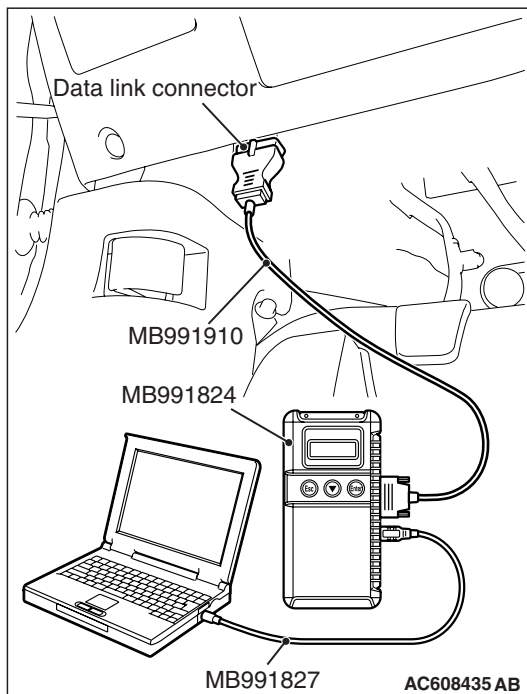
To prevent damage to scan tool MB991958, always turn the ignition switch to the "LOCK" (OFF) position before connecting or disconnecting scan tool MB991958.

- (1) Connect scan tool MB991958 to the data link connector (Refer to P.17-11).
- (2) Turn the ignition switch to the "ON" position.
- (3) Diagnose the CAN bus line (Refer to P.17-11).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the check result satisfactory?

YES : Go to Step 2

NO : Repair the CAN bus lines (Refer to GROUP 54C, Diagnosis –Can Bus Diagnostic Chart P.54C-16). Then go to Step 5.



STEP 2. Using scan tool MB991958, check for CVT system diagnostic trouble code.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for CVT system diagnostic trouble code (Refer to GROUP 23A, Diagnosis –Diagnostic Function [P.23A-14](#)).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is any DTC set?

YES : Diagnose the CVT system (Refer to GROUP 23A, Diagnosis –Diagnostic Trouble Code Chart [P.23A-29](#)). Then go to Step 5.

NO : Go to Step 3.

STEP 3. Using scan tool MB991958, check for MFI system diagnostic trouble code.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for MFI system diagnostic trouble code (Refer to GROUP 13A, Diagnosis –Diagnostic Function [P.13A-10](#)).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is any DTC set?

YES : Diagnose the MFI system (Refer to GROUP 13A, Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#)). Then go to Step 5.

NO : Go to Step 4.

STEP 4. Retest the system**Q: Does hunting occur?**

YES : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 5.

NO : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunction [P.00-13](#)).

STEP 5. Retest the system**Q: Does hunting occur?**

YES : Return to Step 1.

NO : The procedure is complete.

STEP 2. Using scan tool MB991958, check for MFI system diagnostic trouble code.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for MFI system diagnostic trouble code (Refer to GROUP 13A, Diagnosis –Diagnostic Function [P.13A-10](#)).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is DTC U0141 set?

YES : Refer to GROUP 13A, Diagnosis –Diagnostic Trouble Code Procedures –DTC U0141: ETACS-ECU CAN Communication Time Out [P.13A-781](#). Then go to Step 6.

NO : Go to Step 3.

STEP 3. Using scan tool MB991958, check for ETACS system diagnostic trouble code.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Check for ETACS system diagnostic trouble code (Refer to GROUP 54A, ETACS –Troubleshooting –Diagnostic Function [P.54A-479](#)).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is DTC U0155 set?

YES : Refer to GROUP 54A, ETACS –Troubleshooting – Diagnostic Trouble Code Procedures –DTC U0155: Combination Meter-ECU CAN Communication Time Out [P.54A-495](#). Then go to Step 6.

NO : Go to Step 4.

STEP 4. Using scan tool MB991958, check the combination meter system data list item F7: Cruise control indicator.

- (1) Connect scan tool MB991958 to the data link connector (Refer to [P.17-11](#)).
- (2) Turn the ignition switch to the "ON" position.
- (3) Set scan tool MB991958 to data reading mode for combination meter system item F7: Cruise control indicator (Refer to GROUP 54A, Combination Meter –Data List Reference Table [P.54A-71](#)).
- (4) Turn the ignition switch to the "LOCK" (OFF) position.
- (5) Disconnect scan tool MB991958.

Q: Is the check result satisfactory?

YES : Go to Step 5.

NO : Repair the combination meter system (Refer to GROUP 54A, Combination Meter –Troubleshooting – Symptom Procedures –Inspection Procedure 5: The combination meter light does not illuminate normally or the multi information display is not displayed normally [P.54A-66](#)). Then go to Step 6 .

STEP 5. Retest the system.

Q: Does the "CRUISE" indicator light illuminate when the "ON/OFF" (MAIN) switch is turned ON?

YES : It can be assumed that this malfunction is intermittent (Refer to GROUP 00, How to Use Troubleshooting/Inspection Service Points –How to Cope with Intermittent Malfunction [P.00-13](#)).

NO : Replace the ECM. When the ECM is replaced, register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Judgment Table [P.42C-8](#)). Then go to Step 6.

STEP 6. Retest the system.

Q: Does the "CRUISE" indicator light illuminate when the "ON/OFF" (MAIN) switch is turned ON?

YES : The procedure is complete.

NO : Return to Step 1.

DATA LIST REFERENCE TABLE

M1172002400750

⚠ CAUTION

- Driving tests always need two people: one driver and one observer.
- When shifting the selector lever to "D" range the brakes should be applied so that the vehicle does not move forward.

NOTE: *:After the inspection is completed, disconnect the throttle position sensor connector, and then delete the diagnostic trouble code using scan tool MB991958 (Refer to GROUP 13A, Diagnostic Function –How to Read and Erase Diagnostic Trouble Code [P.13A-10](#)).

M.U.T.-III scan tool display	Item number	Inspection item		Inspection requirement		Normal condition
APP sensor (main)	11	Accelerator pedal position sensor (main)		Ignition switch: "ON"	Accelerator pedal: Released	900 –1,100 mV
					Accelerator pedal: Gradually depressed	Increases in response to the pedal depression stroke
					Accelerator pedal: Fully depressed	4,000 mV or more
Brake light switch	74	Stoplight switch		Brake pedal: Depressed		ON
				Brake pedal: Released		OFF
Cancel code	57	Cancel code		Ignition switch: "ON"		The cancel code, which set when the auto-cruise control system was cancelled at the last time.
Cancel switch	75	Auto-cruise control switch	CANCEL	"CANCEL" switch: ON		ON
				"CANCEL" switch: OFF		OFF
Clutch switch	78	Clutch switch <M/T>		Clutch pedal: Depressed		ON
				Clutch pedal: Released		OFF
Cruise switch	81	Auto-cruise control system operation		Auto-cruise control system: active		ON
				Auto-cruise control system: Inactive		OFF
Main switch	86	Auto-cruise control switch	ON/OFF (MAIN)	"ON/OFF" (MAIN) switch: "ON"		ON
				"ON/OFF" (MAIN) switch: "OFF"		OFF
Neutral switch	87	Transmission range switch <CVT>		Transmission range switch: "N" position		ON
				Transmission range switch: Other than "N" position		OFF
Normally closed brake switch	89	Stoplight switch (brake switch)		Brake pedal: Depressed		ON
				Brake pedal: Released		OFF
Resume switch	91	Auto-cruise control switch	ACC/RES	"ACC/RES" switch: ON		ON
				"ACC/RES" switch: OFF		OFF

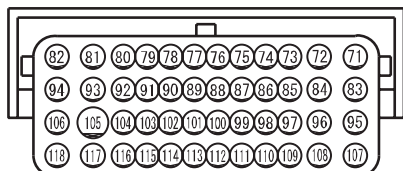
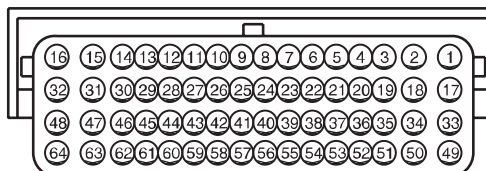
M.U.T.-III scan tool display	Item number	Inspection item		Inspection requirement		Normal condition
Set switch	92	Auto-cruise control switch	COAST/SET	"COAST/SET" switch: ON		ON
				"COAST/SET" switch: OFF		OFF
TP sensor (main)	13	Throttle position sensor (main)*	- Remove the intake air hose at the throttle body. - Disconnect the throttle position sensor connector, and then connect terminals 3, 4, 5 and 6 with the use of the special tool: MB992143 (Test harness). - Ignition switch: "ON"	Fully close the throttle valve with your finger	300 –700 mV	
				Fully open the throttle valve with your finger	4,000 mV or more	
				No load		500 –660 mV
				A/C switch: "OFF" to "ON"		Voltage rises
				Selector lever: "N" to "D"		Voltage rises
Vehicle speed	04	Vehicle speed signal	Road test the vehicle		The speedometer and scan tool MB991958 display the same value.	

**ECM TERMINAL VOLTAGE REFERENCE CHART FOR AUTO-CRUISE CONTROL
SYSTEM OPERATION**

M1172002700591

1. Disconnect all ECM connectors, and connect special tool MB992110 (Power plant ECU check harness) in between.
2. Measure the voltages between the check connector terminals of special tool MB992110 and ground terminals 81 or 93.

Special tool - Power plant ECU check harness (MB992110) connector: Component side

48-Pin connector
(ECM connector B-11)64-Pin connector
(ECM connector B-10)

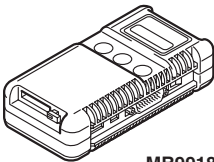
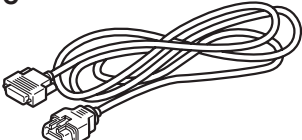
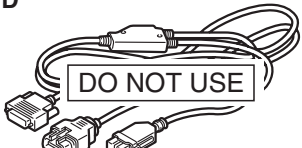
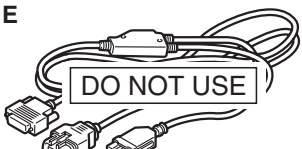
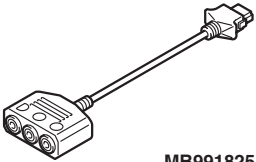
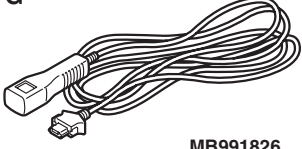
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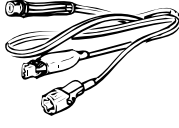
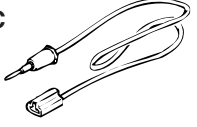
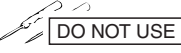
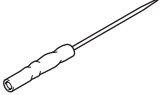
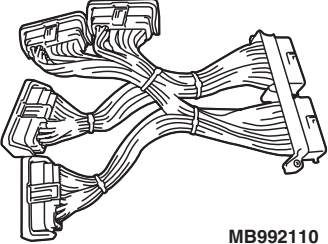
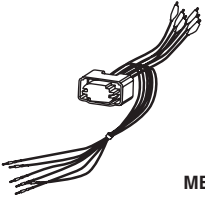
Terminal number	Check item	Check condition		Normal condition
10	Throttle position sensor (main)	- Remove the intake air hose at the throttle body - Disconnect the throttle position sensor, and then connect terminals 3, 4, 5 and 6 with the use of the special tool: MB992143. - Ignition switch: "ON"	Fully close the throttle valve with your finger	0.3 –0.7 V
			Fully open the throttle valve with your finger	4.0 V or more
11	Throttle position sensor (sub)	- Remove the intake air hose at the throttle body - Disconnect the throttle position sensor, and then connect terminals 3, 4, 5 and 6 with the use of the special tool: MB992143 (Test harness). - Ignition switch: "ON"	Fully close the throttle valve with your finger	2.2 –2.8 V
			Fully open the throttle valve with your finger	4.0 V or more
12	Power supply voltage applied to throttle position sensor	Ignition switch: "ON"		4.9 –5.1 V
15	Throttle actuator control motor (+)	- Ignition switch: "ON" - Accelerator pedal: fully opened to fully closed		Decreases slightly (approx. 2 V) from battery voltage.
16	Throttle actuator control motor (–)	- Ignition switch: "ON" - Accelerator pedal: fully closed to fully opened		Decreases slightly (approx. 2 V) from battery voltage.
74	Accelerator pedal position sensor (main)	Ignition switch: "ON"	Release the accelerator pedal	0.735 –1.335 V
			Depress the accelerator pedal.	4.0 V or more

Terminal number	Check item	Check condition		Normal condition
75	Power supply voltage applied to accelerator pedal position sensor (main)	Ignition switch: "ON"		4.9 –5.1 V
77	Accelerator pedal position sensor (sub)	Ignition switch: "ON"	Release the accelerator pedal	0.435 –1.035 V
			Depress the accelerator pedal.	3.7 V or more
78	Power supply voltage applied to accelerator pedal position sensor (sub)	Ignition switch: "ON"		4.9 –5.1 V
85	Clutch switch <M/T>	Ignition switch: "ON"	Depress the clutch pedal.	1V or less
			Release the clutch pedal.	Battery positive voltage
107	Auto-cruise control switch power supply	Ignition switch: "ON"	All switches: OFF	4.7 - 5.0 V
			"ON/OFF" (MAIN) switch: "ON"	0 - 0.5 V
			"CANCEL" switch: ON	1.0 - 1.8 V
			"COAST/SET" switch: ON	2.3 - 3.0 V
			"ACC/RES" switch: ON	3.5 - 4.2 V
108	Stoplight switch (brake switch)	Ignition switch: "ON"	Depress the brake pedal.	Battery positive voltage
			Release the brake pedal.	1V or less
109	Vehicle speed sensor <M/T>	- Ignition switch: "ON" - Move the vehicle forward slowly		0 ⇔ 8 –12 V Changes repeatedly

SPECIAL TOOLS

M1172000600800

Tool	Tool number and name	Supersession	Application
A  MB991824 B  MB991827 C  MB991910 D  MB991911 E  MB991914 F  MB991825 G  MB991826 MB991958	MB991958 A: MB991824 B: MB991827 C: MB991910 D: MB991911 E: MB991914 F: MB991825 G: MB991826 M.U.T.-III sub assembly A: Vehicle communication interface (V.C.I.) B: M.U.T.-III USB cable C: M.U.T.-III main harness A (Vehicles with CAN communication system) D: M.U.T.-III main harness B (Vehicles without CAN communication system) E: M.U.T.-III main harness C (for Daimler Chrysler models only) F: M.U.T.-III measurement adapter G: M.U.T.-III trigger harness	MB991824-KIT <i>NOTE: G: MB991826 M.U.T.-III trigger harness is not necessary when pushing V.C.I. ENTER key.</i>	Checking data list CAUTION For vehicles with CAN communication, use M.U.T.-III main harness A to send simulated vehicle speed. If you connect M.U.T.-III main harness B or C instead, the CAN communication does not function correctly.

Tool	Tool number and name	Supersession	Application
A  B  C  D  MB991223AZ	MB991223 A: MB991219 B: MB991220 C: MB991221 D: MB991222 Harness set A: Test harness B: LED harness C: LED harness adaptor D: Probe	General service tools	Checking the continuity and measuring the voltage at the harness connector
 MB992006	MB992006 Extra fine probe	General service tool	Continuity check and voltage measurement at harness wire or connector for loose, corroded or damaged terminals, or terminals pushed back in the connector.
 MB992110	MB992110 Power plant ECU check harness	—	Measuring the terminal voltage at the ECM
 MB992143	MB992143 Test harness	—	Measuring the terminal voltage at the TP sensor

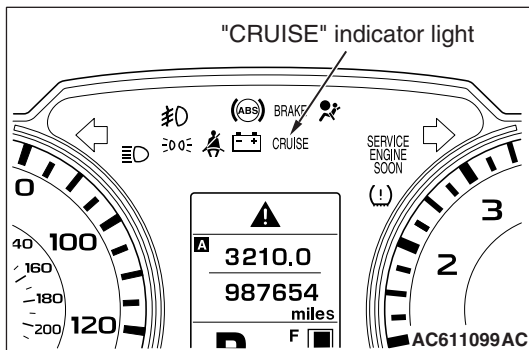
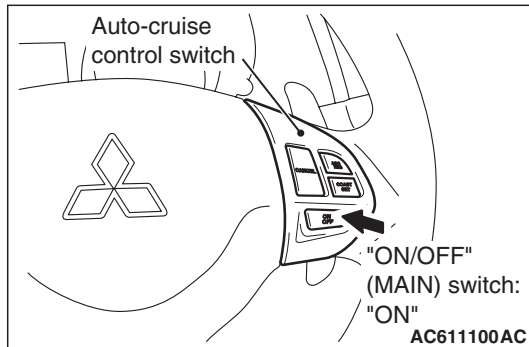
ON-VEHICLE SERVICE

AUTO-CRUISE CONTROL SWITCH CHECK

M1172001200355

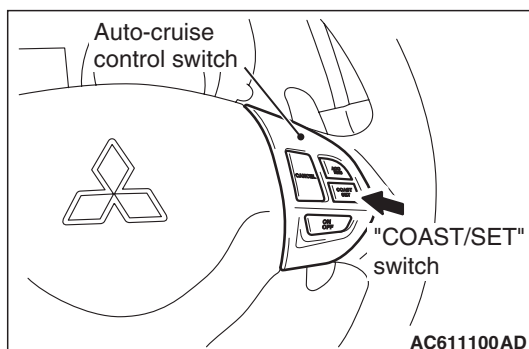
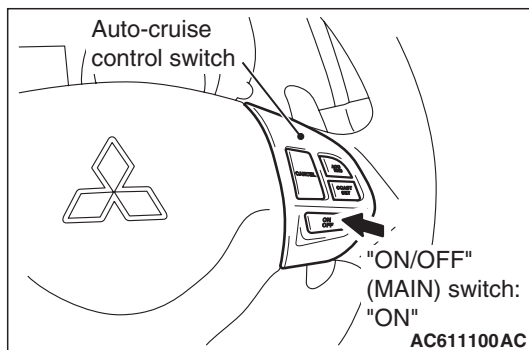
AUTO-CRUISE CONTROL MAIN SWITCH CHECK

1. Check that the "CRUISE" indicator light within the combination meter illuminates when the "ON/OFF" (MAIN) switch is switched "ON".
2. Press the "ON/OFF" (MAIN) switch again, and check that the "CRUISE" indicator light within the combination meter goes out.



AUTO-CRUISE CONTROL SETTING

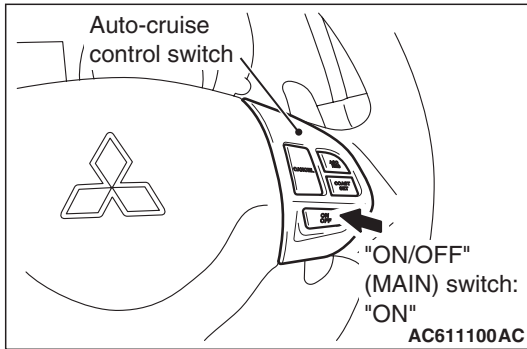
1. Switch the "ON/OFF" switch to "ON".
2. Drive at the desired speed, above approximately 40 km/h (25 mph).



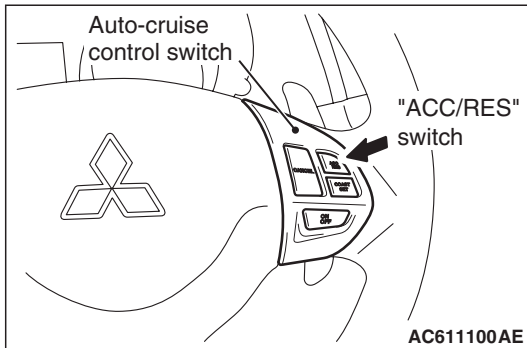
3. Push the "COAST/SET" switch.
4. Check to be sure that when the "COAST/SET" switch is released the speed is the constant speed.

NOTE: If the vehicle speed decreases to approximately 15 km/h (9 mph) below the set speed because of climbing a hill for example, it is normal for the auto-cruise control to be cancelled. When the vehicle speed becomes approximately 40 km/h (25 mph) or less, driving at constant speed will be cancelled even if the vehicle speed does not decrease 15 km/h (9 mph) or more.

SPEED-INCREASE SETTING



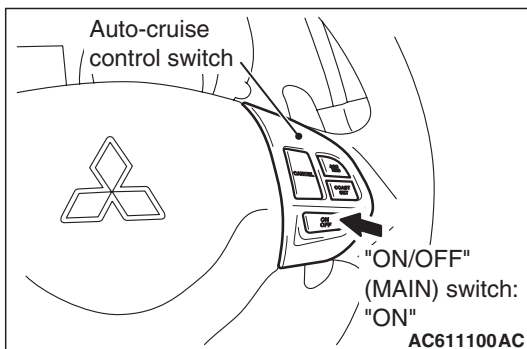
1. Switch the "ON/OFF" switch to "ON".
2. Set to the desired speed, above approximately 40 km/h (25 mph).



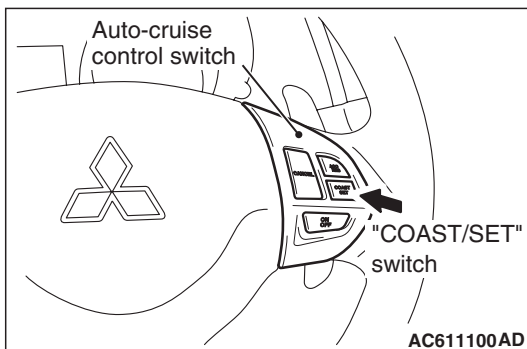
3. Push the "ACC/RES" switch.
4. Check to be sure that acceleration continues while the "ACC/RES" switch is pushed, and that the speed at the time it was released becomes the constant driving speed.

NOTE: Acceleration can be continued even if the vehicle speed has passed the high-speed limit [approximately 200 km/h (125 mph)]. But the constant driving speed when the "ACC/RES" switch is released will be recorded as the high-speed limit.

SPEED-REDUCTION SETTING

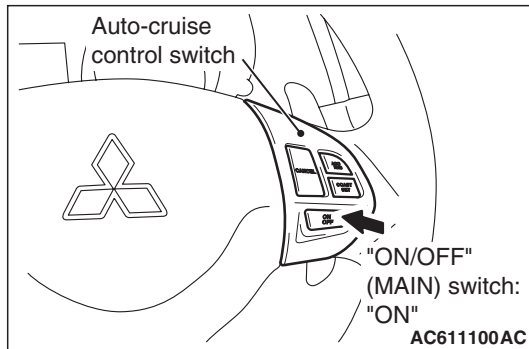


1. Switch the "ON/OFF" switch to "ON".
2. Set to the desired speed, above approximately 40 km/h (25 mph).

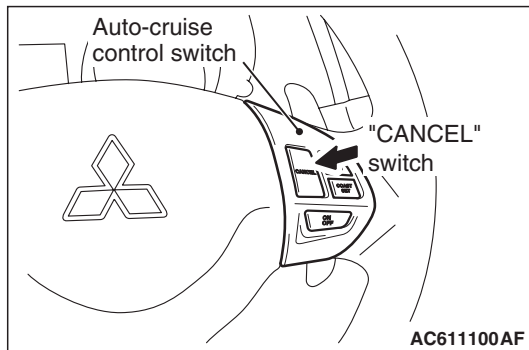


3. Push the "COAST/SET" switch.
4. Check to be sure that deceleration continues while the "COAST/SET" switch is pushed, and that the speed at the time it was released becomes the constant driving speed.

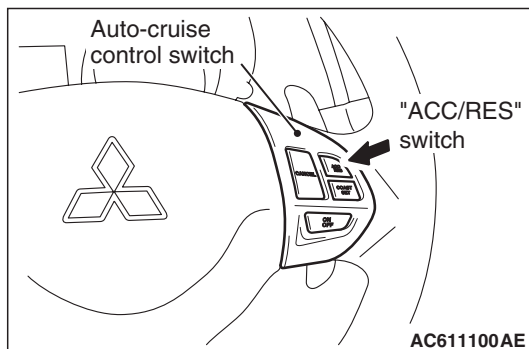
NOTE: When the vehicle speed reaches the low limit [approximately 40 km/h (25 mph)] during deceleration, the auto-cruise control will be cancelled.

**RETURN TO THE SET SPEED BEFORE
CANCELLATION AND AUTO-CRUISE CONTROL
CANCELLATION**

1. Switch the "ON/OFF" switch to "ON".
2. Set to the desired speed, above approximately 40 km/h (25 mph).
3. When any of the following operations are performed while at constant speed during auto-cruise control, check if normal driving is resumed and deceleration occurs.



- (1) The "CANCEL" switch is pushed.
- (2) The brake pedal is depressed.



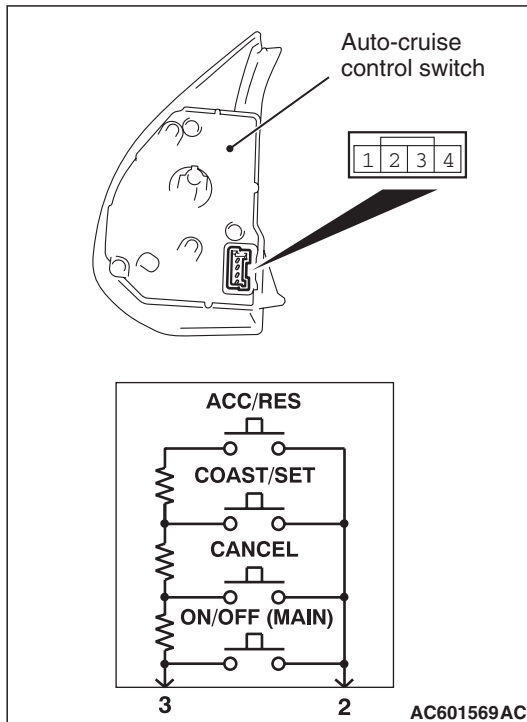
4. At a vehicle speed of approximately 40 km/h (25 mph) or higher, check if when the "ACC/RES" switch is pushed, the vehicle speed returns to the speed before auto-cruise control driving was cancelled, and constant speed driving occurs.
5. When the "ON/OFF" (MAIN) switch is switched to "OFF" while driving at constant speed, check if normal driving is resumed and deceleration occurs.

AUTO-CRUISE CONTROL SYSTEM COMPONENT CHECK

M1172001700770

AUTO-CRUISE CONTROL SWITCH CHECK

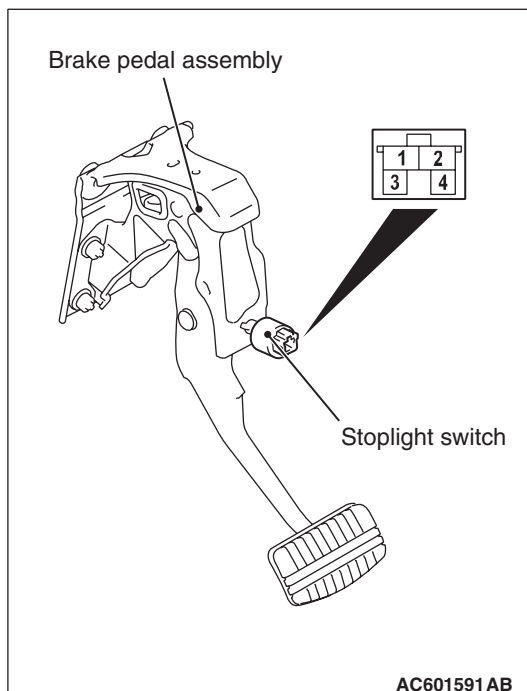
1. Remove the auto-cruise control switch (Refer to [P.17-69](#)).
2. Measure the resistance between terminal 2 and terminal 3 when each of the "ON/OFF" (MAIN), "CANCEL", "COAST/SET" and "ACC/RES" switches is pressed. If the values measured at the time each switch is pressed correspond to those in the table below, the resistance values are correct.



Switch position	Specified condition
All switches are OFF.	Open circuit
"ON/OFF" (MAIN) switch is "ON".	Continuity (less than 2 ohms)
"CANCEL" switch is ON.	202.5 - 208 Ω
"COAST/SET" switch is ON.	610.5 - 624.5 Ω
"ACC/RES" switch is ON.	1838 - 1877 Ω

STOPLIGHT SWITCH CHECK

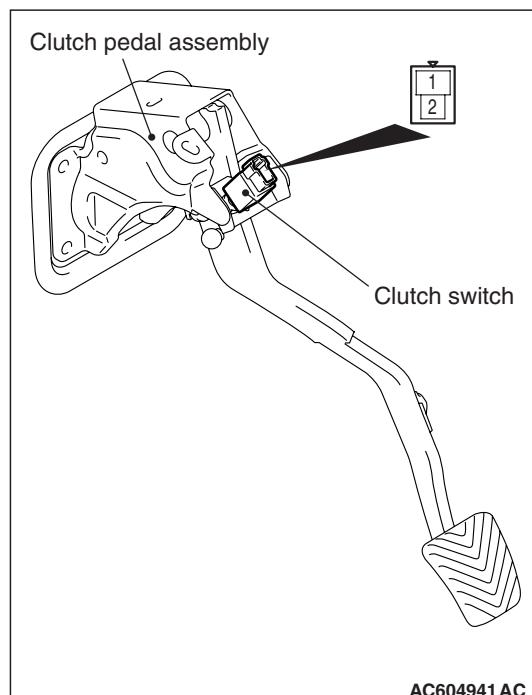
1. Disconnect the stoplight switch harness connector.
2. Check for continuity between the terminals of the switch.



Measurement condition	Terminal connector of tester	Specified condition
When brake pedal is depressed.	1 -2 (for stoplight switch)	Continuity (less than 2 ohms)
	3 -4 (for brake switch)	Open circuit
When brake pedal is not depressed.	1 -2 (for stoplight switch)	Open circuit
	3 -4 (for brake switch)	Continuity (less than 2 ohms)

CLUTCH SWITCH CHECK <M/T>

1. Disconnect the clutch switch harness connector.
2. Check for continuity between the terminals of the switch.



Measurement condition	Terminal connector of tester	Specified condition
When clutch pedal is depressed.	1 –2	Continuity (less than 2 ohms)
When clutch pedal is not depressed.	1 –2	Open circuit

**TRANSMISSION RANGE SWITCH ("N" POSITION)
<CVT>**

Refer to GROUP 23A, On-vehicle Service –Essential Service [P.23A-136](#).

THROTTLE ACTUATOR CONTROL MOTOR

Refer to GROUP 13A, On-vehicle Service –Throttle Actuator Control Motor Check [P.13A-943](#).

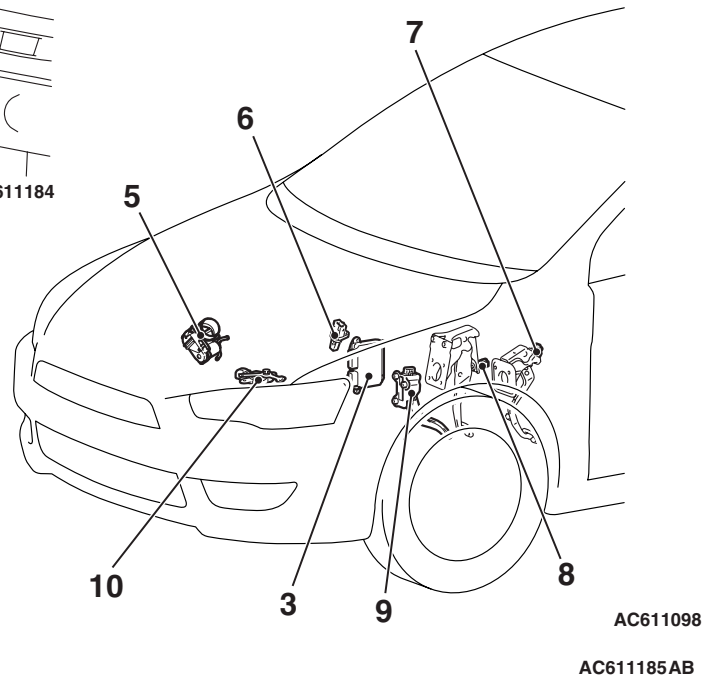
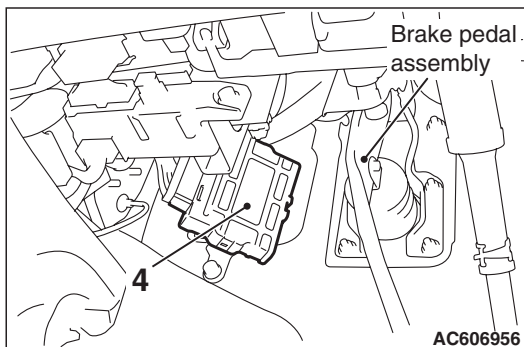
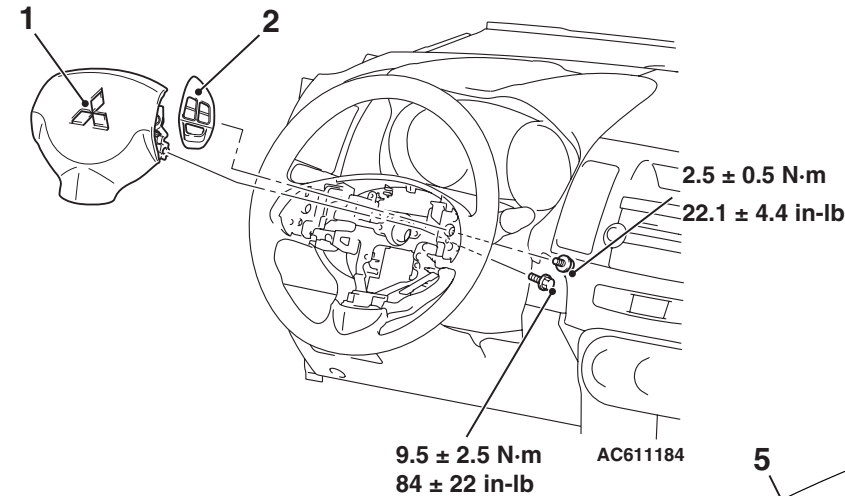
AUTO-CRUISE CONTROL

REMOVAL AND INSTALLATION

M1172001400780

CAUTION

Do not replace the ECM and the ETACS-ECU simultaneously. Always replace either one of the ECUs first, and register the encrypted code (Refer to GROUP 42C, Troubleshooting –ID Code Registration Necessity Judgment Table [P.42C-8](#)). Then, replace the other ECU.



Auto-cruise control switch removal steps

1. Air bag module (driver's side) (Refer to GROUP 52B, Air Bag Modules and Clock Spring [P.52B-367](#))
2. Auto-cruise control switch

Control unit removal

3. ECM [Refer to GROUP 13A, Engine Control Module (ECM) [P.13A-952](#)]
4. TCM <CVT> [Refer to GROUP 23A, Transmission Control Module (TCM) [P.23A-155](#)]

Sensor removal

5. Throttle body (built-in throttle position sensor and throttle actuator control motor) (Refer to GROUP 13A, Throttle Body [P.13A-950](#))
6. Vehicle speed sensor <M/T> (Refer to 22B, Transaxle [P.22B-11](#))
7. Clutch switch <M/T> (Refer to 21, Clutch Pedal and Master Cylinder [P.21A-4](#))
8. Stoplight switch (Refer to GROUP 35A, Brake Pedal [P.35A-34](#))
9. Accelerator pedal (built-in accelerator pedal position sensor) (Refer to [P.17-8](#))
10. Transmission range switch <CVT> (Refer to 23B, Transaxle [P.23B-10](#))

EMISSION CONTROL <MFI>**GENERAL INFORMATION**

M1173000101038

The emission control system consists of the following subsystems:

- Positive crankcase ventilation (PCV) system
- Evaporative emission system
- Exhaust emission control system

SERVICE SPECIFICATIONS

M1173000300909

ITEM	STANDARD VALUE
Emission control system	
Exhaust gas recirculation (EGR) valve (Stepper Motor) connector resistance <California> [at 20° C (68° F)] Ω	20 –24
Evaporative emission purge solenoid coil resistance [at 20° C (68° F)] Ω	22 –26
Evaporative emission ventilation solenoid coil resistance [at 20° C (68° F)] Ω	17 –21
Purge flow cm^3/s (SCFH) [at 80 –95° C (176 –205° F) with sudden revving]	20 (2.5)

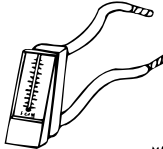
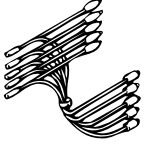
DIAGNOSIS

M1173000700219

SYMPTOM	PROBABLE CAUSE	REMEDY
Engine will not start or hard to start	Vacuum hose disconnected or damaged	Repair or replace
	The EGR valve (Stepper Motor) is not closed. <California>	Repair or replace
	Malfunction of the evaporative emission purge solenoid	Repair or replace
Rough idle or engine stalls	The EGR valve (Stepper Motor) is not closed. <California>	Repair or replace
	Vacuum hose disconnected or damaged.	Repair or replace
	Malfunction of the PCV valve	Replace
	Malfunction of the purge control system	Check the system; If there is a problem, check its component parts.
Engine hesitates or poor acceleration	Malfunction of the EGR system	Check the system; If there is a problem, check its component parts.
Excessive oil consumption	PCV line clogged	Check PCV system
Poor fuel mileage	Malfunction of the EGR system	Check the system; If there is a problem, check its component parts.

SPECIAL TOOLS

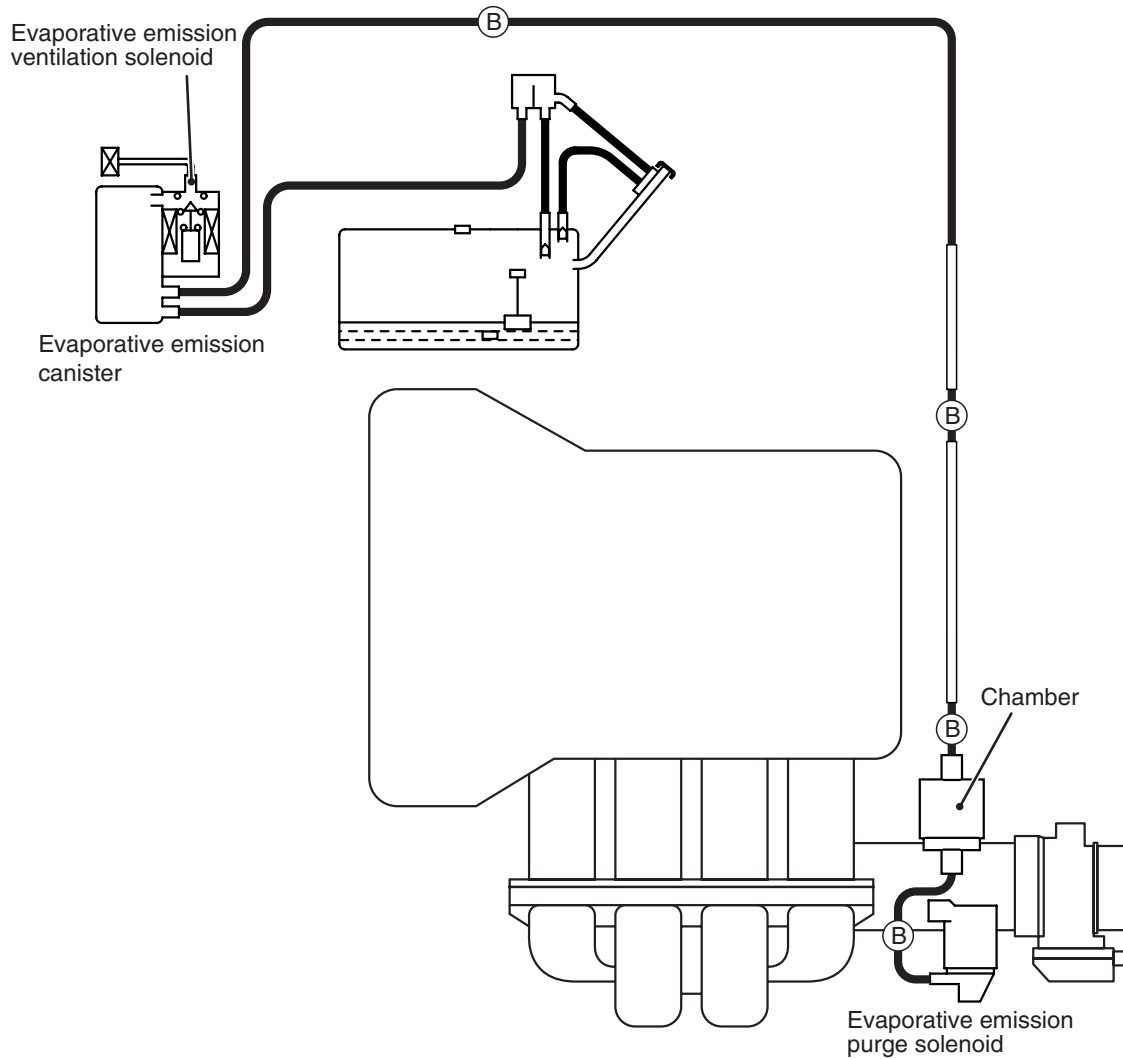
M1173000600621

TOOL	TOOL NUMBER AND NAME	SUPERSESSION	APPLICATION
 MB991700	MB995061 Purge flow indicator	MLR6890A Part of MIT280220	Inspection of purge control system
 MB991658	MB991658 Test harness set	Tool not available	Inspection of EGR valve (Stepper Motor)

VACUUM HOSES

VACUUM HOSE ROUTING

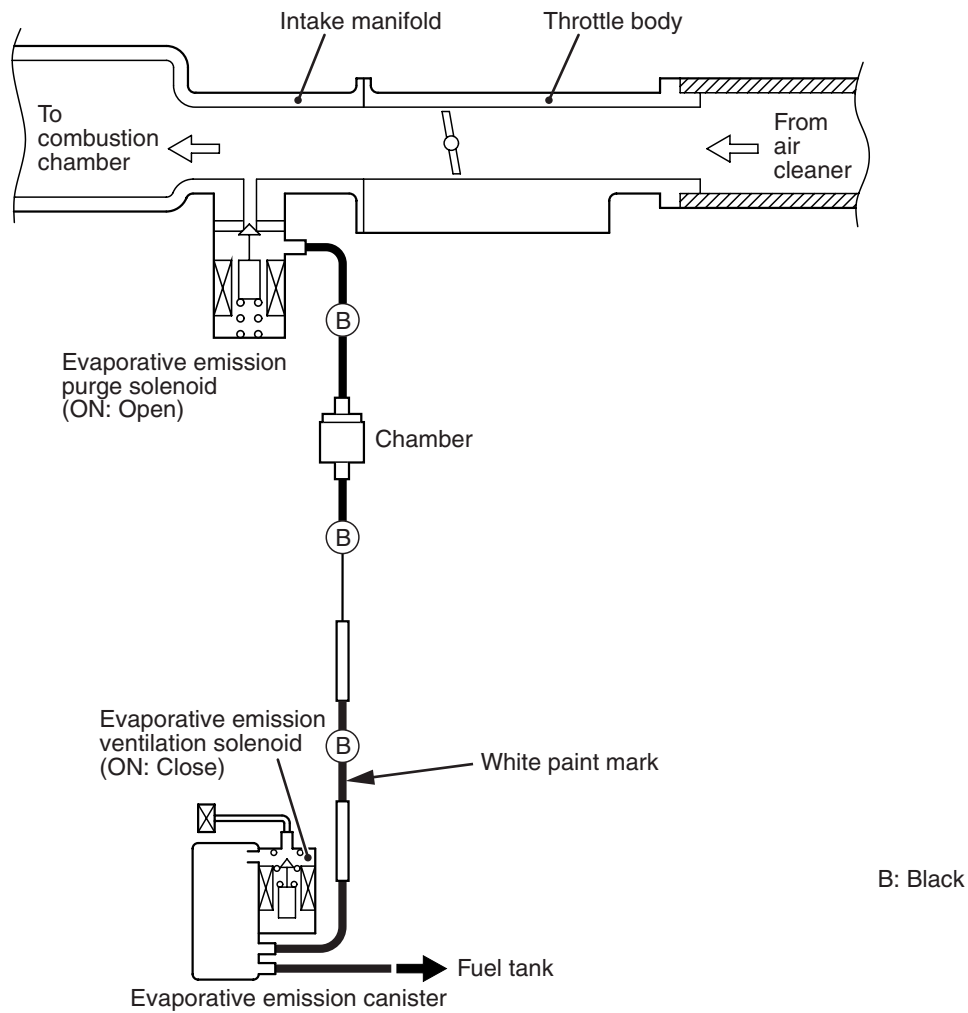
M1173000901067



AK604159 AB

VACUUM CIRCUIT DIAGRAM

M1173007100791



AK604160 AB

VACUUM HOSE INSTALLATION

M1173007200378

1. When connecting the vacuum hoses, they should be securely inserted onto the nipples.
2. Connect the hoses correctly, using the VACUUM HOSE ROUTING diagram as a guide.

VACUUM HOSE CHECK

M1173007300472

1. Using the VACUUM HOSE ROUTING diagram as a guide, check that the vacuum hoses are correctly connected.
2. Check the connection of the vacuum hoses, (removed, loose, etc.) and confirm that there are no sharp bends or damage.

POSITIVE CRANKCASE VENTILATION SYSTEM

GENERAL INFORMATION (POSITIVE CRANKCASE VENTILATION SYSTEM)

M1173005000925

The positive crankcase ventilation (PCV) system prevents the escape of blow-by gases from inside the crankcase into the atmosphere.

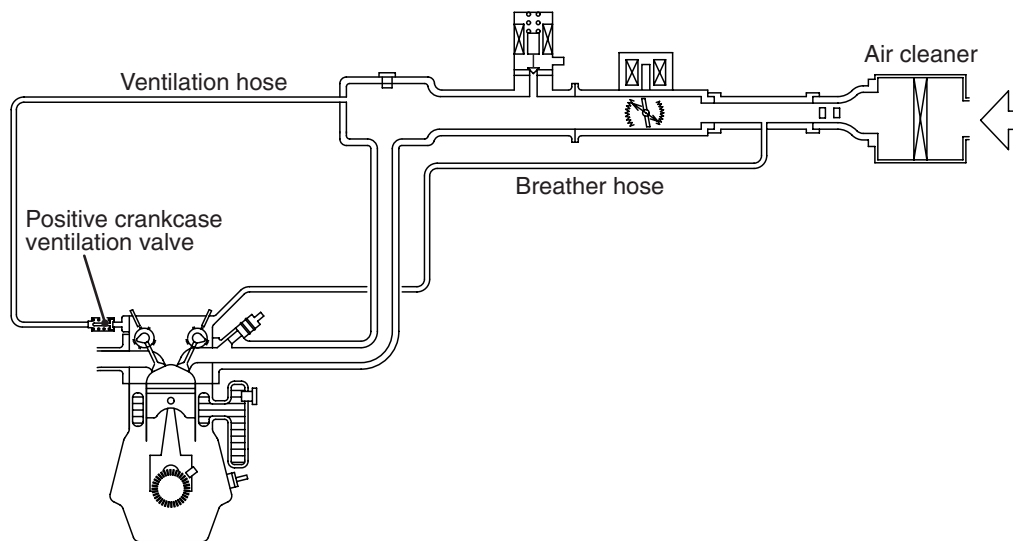
Fresh air is sent from the air cleaner into the crankcase through the breather hose to be mixed with the blow-by gas inside the crankcase.

The blow-by gas inside the crankcase is drawn into the intake manifold through the PCV valve.

The PCV valve is designed to lift the plunger according to the intake manifold vacuum so as to regulate the flow of blow-by gas properly.

In other words, the blow-by gas flow is regulated during low load engine operation to maintain engine stability, while the flow is increased during high load operation to improve the ventilation performance.

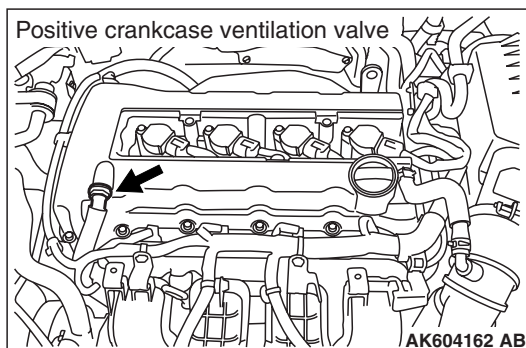
SYSTEM DIAGRAM



AK604161 AB

COMPONENT LOCATION

M1173007400651



POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM CHECK

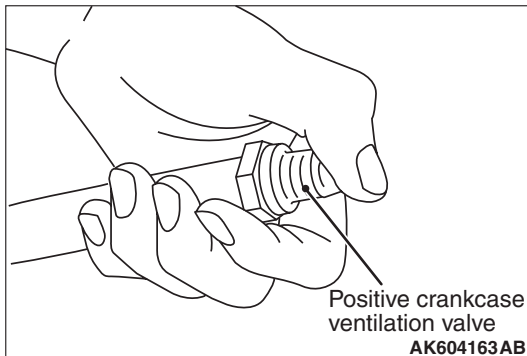
M1173001100674

1. Remove the ventilation hose from the positive crankcase ventilation (PCV) valve.
2. Remove the PCV valve from the rocker cover.
3. Reinstall the PCV valve at the ventilation hose.
4. Start the engine and run at idle.
5. Place a finger at the opening of the PCV valve and check that vacuum of the intake manifold is felt.

NOTE: At this moment, the plunger in the PCV valve moves back and forth.

6. If vacuum is not felt, clean the PCV valve or replace it.
7. Apply a small amount of new engine oil to the O-ring on the PCV valve, and tighten to the specified torque.

Standard value: 2.5 ± 0.4 N·m (22 in -lb)

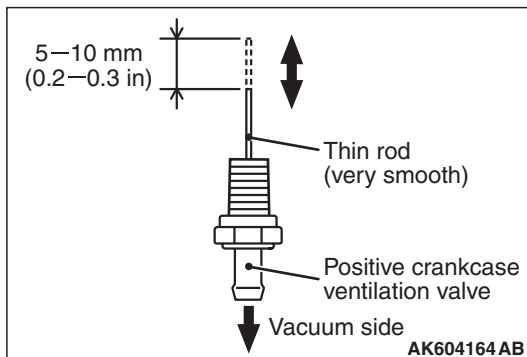


POSITIVE CRANKCASE VENTILATION (PCV) SYSTEM CHECK

M1173001200604

1. Remove the ventilation hose from the positive crankcase ventilation (PCV) valve.
2. Remove the PCV valve from the rocker cover.
3. Hold the PCV valve with the vacuum side down. Insert a thin rod, and using light pressure, depress the end of the PCV valve spring by 5 –10 mm (0.2 –0.3 inch). Release pressure on the rod to see if the PCV valve spring will lift the rod to its original position.
4. If the rod returns quickly to its original position, the PCV valve is OK. If the stick does not return quickly, clean or replace the PCV valve.
5. Apply a small amount of new engine oil to the O-ring on the PCV valve, and tighten to the specified torque.

Standard value: 2.5 ± 0.4 N·m (22 in -lb)



EVAPORATIVE EMISSION CONTROL SYSTEM

GENERAL INFORMATION (EVAPORATIVE EMISSION SYSTEM)

M1173005101099

The evaporative emission (EVAP) system prevents fuel vapors generated in the fuel tank from escaping into the atmosphere.

Fuel vapors from the fuel tank flow through the vapor pipe/hose to be stored temporarily in the EVAP canister.

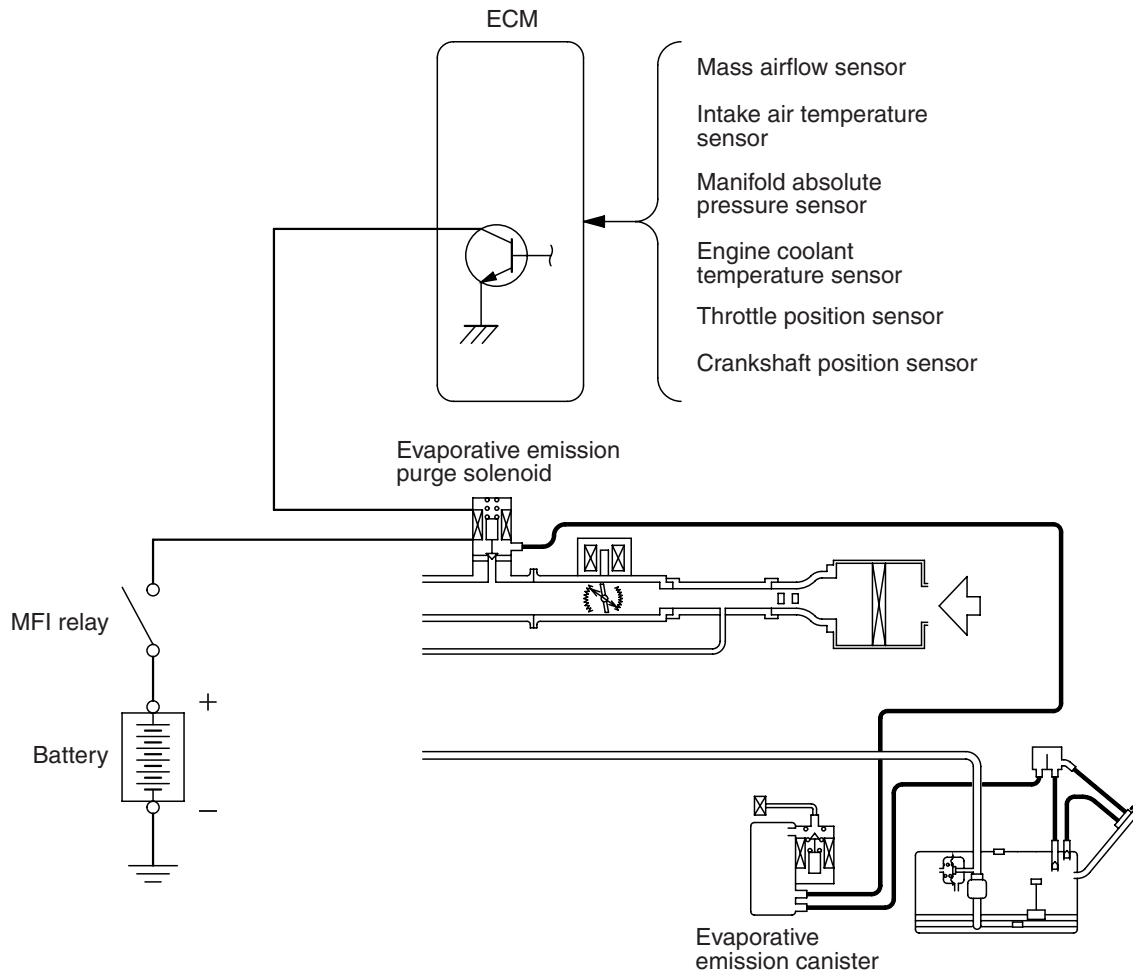
When the vehicle is in operation, fuel vapors stored in the EVAP canister flow through the EVAP purge solenoid, purge port and intake manifold plenum to the combustion chamber.

When the engine coolant temperature is low or when the intake air quantity is small (when the engine is at idle, for example), the engine control module (ECM) brings the EVAP purge solenoid into the OFF state to shut off the fuel vapor flow to the intake manifold plenum. This ensures driveability when the engine is cold or running under low load and also stabilizes the emission level.

An EVAP ventilation solenoid is provided between the EVAP canister and atmosphere to monitor for OBD-II EVAP leaks. This solenoid is normally OFF. However, it turns ON when monitoring for OBD-II EVAP leaks and shuts off the atmosphere flow to the EVAP canister. Then the fuel tank differential pressure sensor monitors the fuel vapor pressure to detect OBD-II EVAP leaks. The fuel overflow limiter valve and the leveling valve prevent fuel from being overfilled. The fuel overflow limiter valve and the leveling valve prevents fuel leaks if the vehicle is rolled over in an accident.

The EVAP ventilation valve releases the air from the fuel tank through the EVAP canister into the atmosphere when the fuel tank pressure increases due to refueling, etc. The EVAP ventilation valve and the air filter supply the atmospheric air to the EVAP canister when the fuel tank pressure decreases.

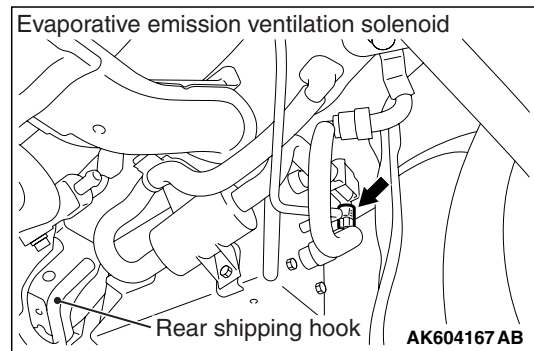
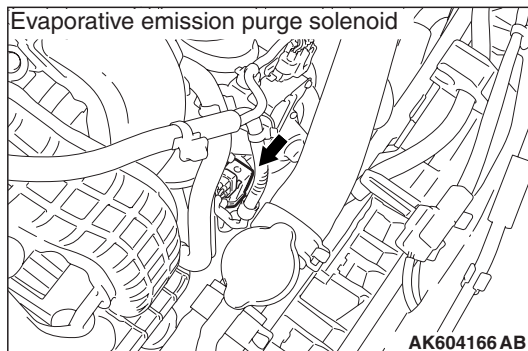
SYSTEM DIAGRAM



AK604165 AB

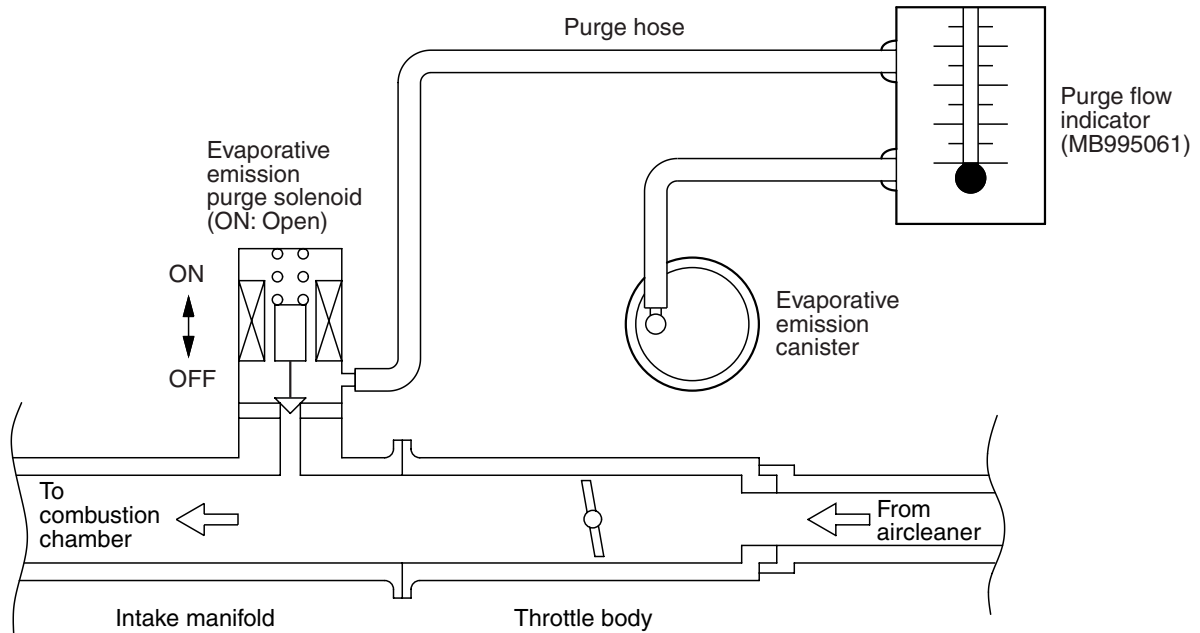
COMPONENT LOCATION

M1173007500595



**PURGE CONTROL SYSTEM CHECK (PURGE
FLOW CHECK)**

M1173001401009



AK604168 AB

Required Special Tool:

MB995061: Purge Flow Indicator

1. Disconnect the purge hose from the evaporative emission (EVAP) purge solenoid, and connect special tool MB995061 between the EVAP purge solenoid and the purge hose.
2. Before inspection, set the vehicle in the following conditions:
 - Engine coolant temperature: 80 –95° C (176 –203° F)
 - Lights, electric cooling fan and accessories: OFF
 - Transaxle: Neutral (P range on vehicles with CVT)

NOTE: Vehicles for Canada, the headlight, taillight, etc. remain lit even when the lighting switch is in "OFF" position but this is no problem for checks.

3. Run the engine at idle for more than four minutes.
4. Check the purge flow volume when engine is revved suddenly several times.

Standard value: Momentarily 20 cm³/s (2.5 SCFH) or more.

- If the purge flow volume is less than the standard value, check it again with the vacuum hose disconnected from the EVAP canister. If the purge flow volume is less than the standard value, check the vacuum port and the vacuum hose for clogging. Also check the EVAP purge solenoid. If the purge flow volume is at the standard value, replace the EVAP canister.

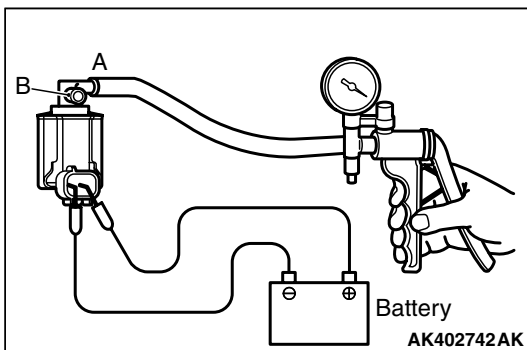
EVAPORATIVE EMISSION PURGE SOLENOID CHECK

M1173001700632

- Disconnect the inlet manifold from the EVAP purge solenoid valve.

NOTE: When disconnecting the vacuum hose, always place an identification mark so that it can be reconnected at its original position.

- Disconnect the harness connector.
- Connect a hand vacuum pump to nipple (A) of the EVAP purge solenoid (refer to the illustration at left).
- As described in the chart below, check airtightness by applying a vacuum with voltage applied directly from the battery to the EVAP purge solenoid valve and without applying voltage.

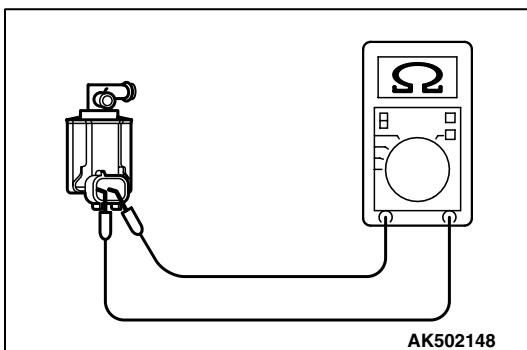


BATTERY POSITIVE VOLTAGE	NORMAL CONDITION
Applied	Vacuum leaks
Not applied	Vacuum maintained

- Measure the resistance between the terminals of the EVAP purge solenoid.

Standard value: 22 –26 ohms [at 20° C (68° F)]

- Replace the solenoid if airtightness or resistance is out of specification.



MASS AIRFLOW SENSOR CHECK

M1173050400172

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#).

INTAKE AIR TEMPERATURE SENSOR CHECK

M1173008200382

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#).

**MANIFOLD ABSOLUTE PRESSURE SENSOR
CHECK**

M1173050000129

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#).

**ENGINE COOLANT TEMPERATURE SENSOR
CHECK**

M1173008100738

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#).

THROTTLE POSITION SENSOR CHECK

M1173050500016

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#).

CRANKSHAFT POSITION SENSOR CHECK

M1173008300390

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#).

EXHAUST GAS RECIRCULATION (EGR) SYSTEM

GENERAL INFORMATION (EXHAUST GAS RECIRCULATION SYSTEM) <CALIFORNIA>

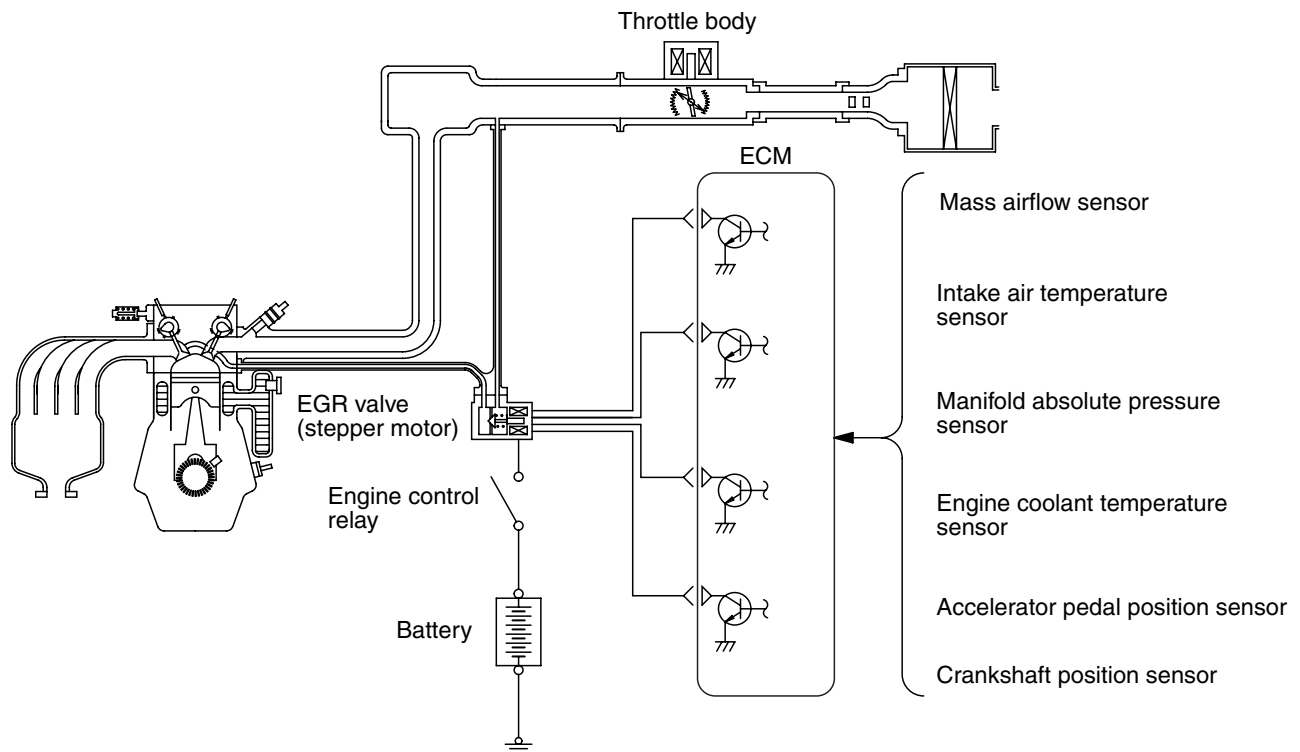
M1173005200930

The exhaust gas recirculation system (EGR) lowers the nitrogen oxides (NOx) emission level. When the air/fuel mixture combustion temperature is high, a large quantity of NOx is generated in the combustion chamber. Therefore, this system recirculates part of exhaust gas from the exhaust port of the cylinder head to the combustion chamber through the intake manifold to decrease the air/fuel mixture combustion temperature, resulting in reduction of NOx. The EGR flow rate is controlled by the EGR valve (Stepper Motor) for driveability quality.

OPERATION

When the engine coolant temperature is low, when the engine is at idle or when a wide open throttle operation is performed, the EGR valve (Stepper Motor) is kept closed, achieving no EGR. After warming up the engine, the EGR valve (Stepper Motor) can be opened by the engine control module (ECM). The ECM monitors the EGR system and illuminates the Malfunction Indicator Lamp (SERVICE ENGINE SOON or Check Engine Lamp) to indicate that there is a malfunction.

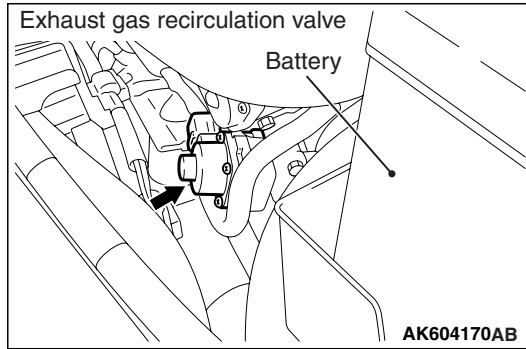
SYSTEM DIAGRAM



AK604169 AB

COMPONENT LOCATION

M1173007600570



EGR VALVE (STEPPER MOTOR) CHECK

M1173050200424

Required Special Tool:

MB991658: Test Harness Set

Checking the Operation Sound

1. Check that the operation sound of the stepper motor can be heard from the EGR valve when the ignition switch is turned ON (without starting the engine).
2. If the operation sound cannot be heard, inspect the drive circuit of the stepper motor.

NOTE: If the operation sound is not heard, and the circuit is normal, either the stepper motor or the ECM may have failed.

Checking the Coil Resistance

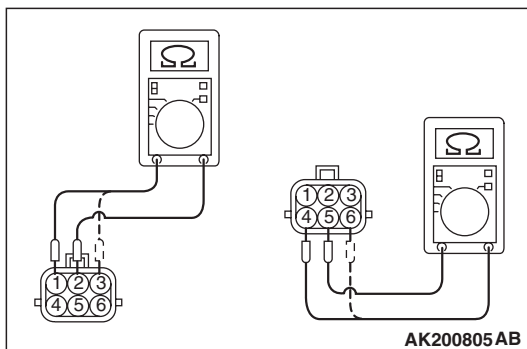
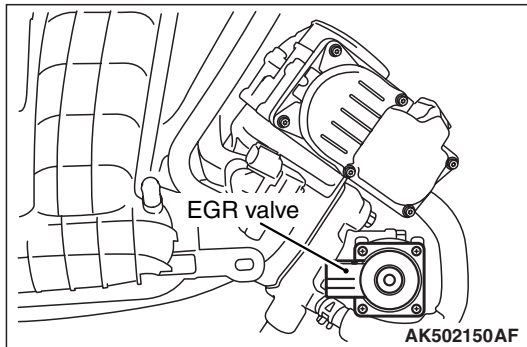
1. Remove the EGR valve.
2. Measure the resistance between terminal No. 2 and either terminal No. 1 or terminal No. 3 of the connector at the EGR valve.

Standard value: 20 –24 Ω [at 20° C (68° F)]

3. If the resistance is not within the standard, replace the EGR valve.
4. Measure the resistance between terminal No. 5 and either terminal No. 6 or terminal No. 4 of the connector at the EGR valve.

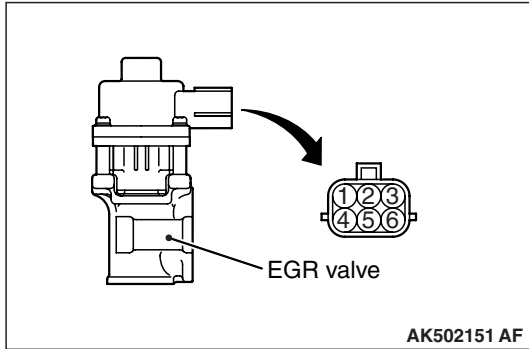
Standard value: 20 –24 Ω [at 20° C (68° F)]

5. If the resistance is not within the standard, replace the EGR valve.

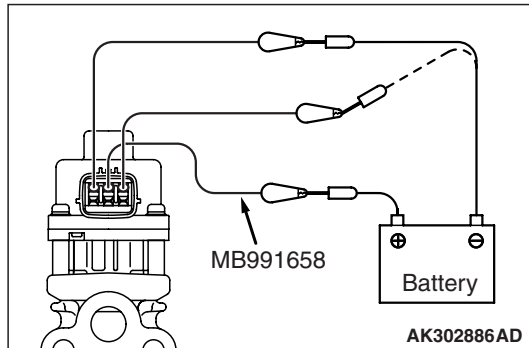


Operation Check

1. Remove the EGR valve.



2. Connect special tool MB991658 to the EGR valve.



3. Connect the battery positive (+) terminal to terminal No. 2.

CAUTION

Connecting battery voltage to the EGR valve for a long time could damage the coil.

4. Connect terminals 1 and 3 to the negative (-) terminal of the battery, in order to test whether the stepper motor vibrates (with a slight shudder), indicating that the stepper motor is operating.

5. Connect the battery positive (+) terminal to terminal No. 5.

CAUTION

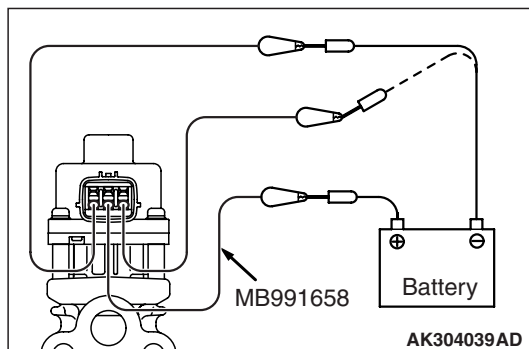
Connecting battery voltage to the EGR valve for a long time could damage the coil.

6. Connect terminals 4 and 6 to the negative (-) terminal of the battery, in order to test whether the stepper motor vibrates (with a slight shudder), indicating that the stepper motor is operating.

7. If vibrations can be felt as a result of the test, the stepper motor is determined to be normal.

8. Using a new gasket, install the EGR valve by tightening its mounting bolts to the specified torque.

Tightening torque: 24 ± 3 N·m (212 ± 27 in·lb)



EGR VALVE (STEPPER MOTOR) CLEANING

M1173050300067

NOTE: DO not use solvents or other cleaning agents, which will enter the motor and cause a malfunction.

Remove the EGR valve and make sure that it is not stuck and does not have any carbon deposits. If there are any carbon deposits, use a wire brush to clean it.

MASS AIRFLOW SENSOR CHECK

M1173050400183

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#).

INTAKE AIR TEMPERATURE SENSOR CHECK

M1173008200393

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#).

MANIFOLD ABSOLUTE PRESSURE SENSOR CHECK

M1173050000130

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#).

ENGINE COOLANT TEMPERATURE SENSOR CHECK

M1173008100749

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#).

ACCELERATOR PEDAL POSITION SENSOR CHECK

M1173050500027

To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#).

CRANKSHAFT POSITION SENSOR CHECK

M1173008300389

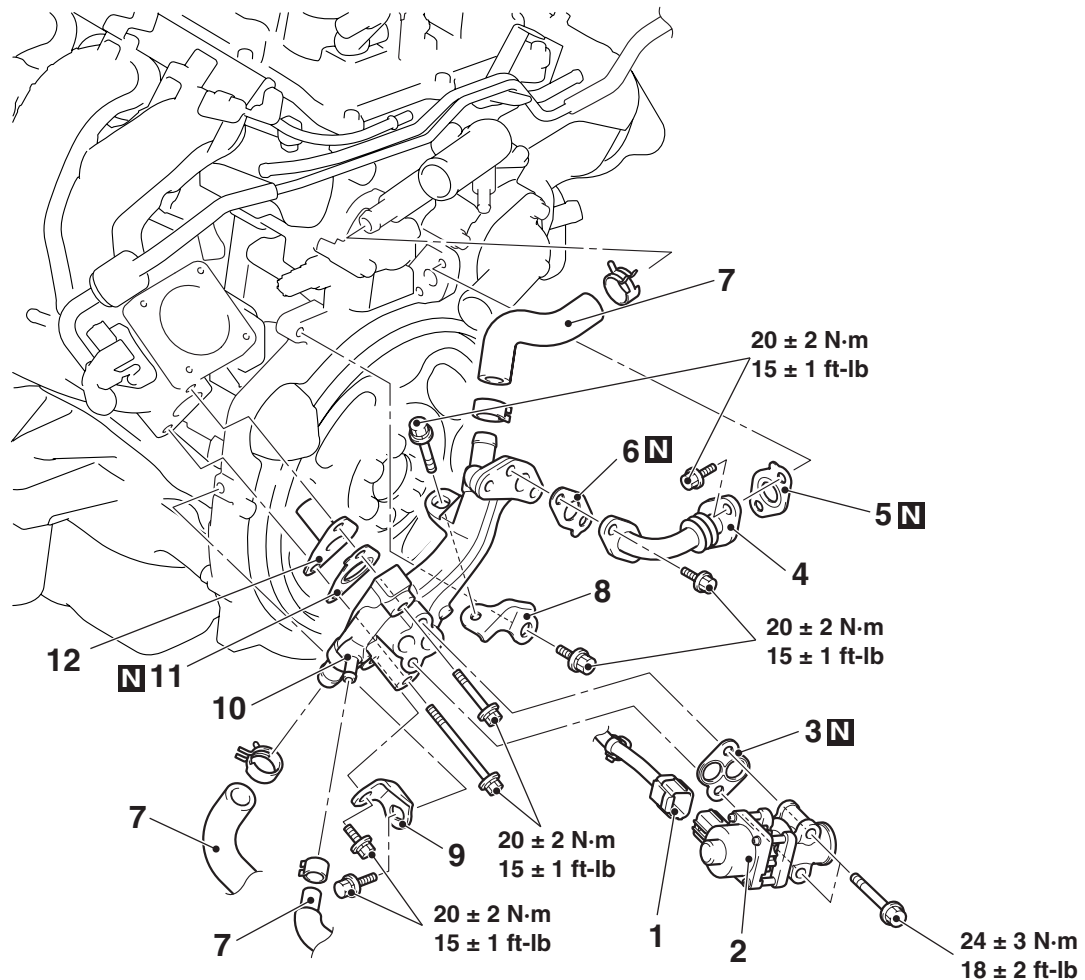
To inspect the sensor, refer to GROUP 13A, Multiport Fuel Injection (MFI) –Multiport Fuel Injection (MFI) Diagnosis –Diagnostic Trouble Code Chart [P.13A-46](#).

REMOVAL AND INSTALLATION

M1173010500818

Pre-removal and post-installation operation

- Air Cleaner Assembly Removal and Installation (Refer to GROUP 15 –Air Cleaner P.15-4).
- Throttle Body Assembly Removal and Installation (Refer to GROUP 13A –Throttle Body Assembly P.13A-950).
- Oil Filler Tube Assembly Removal and Installation (Refer to GROUP 23A –Transaxle Assembly P.23A-149). <CVT>



AC605404AC

Removal steps

1. EGR valve connector
2. EGR valve
3. EGR valve gasket
4. EGR valve pipe
5. EGR pipe gasket
6. EGR pipe gasket

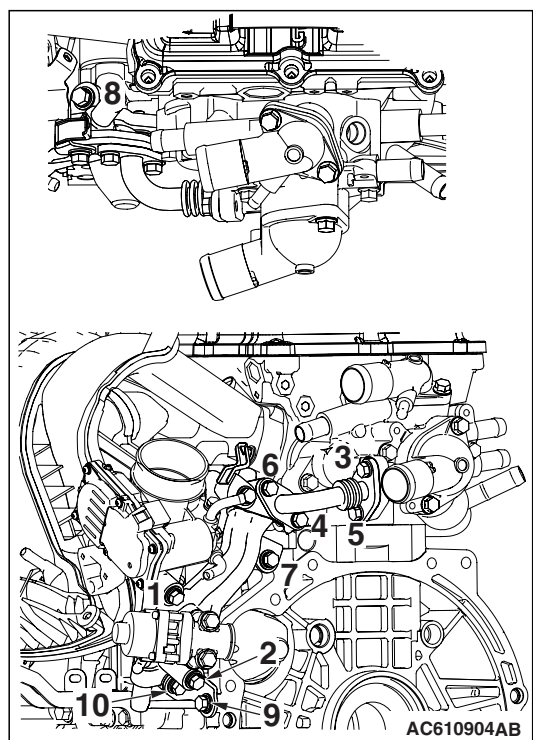
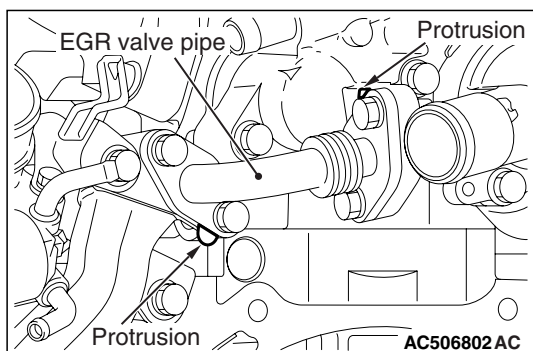
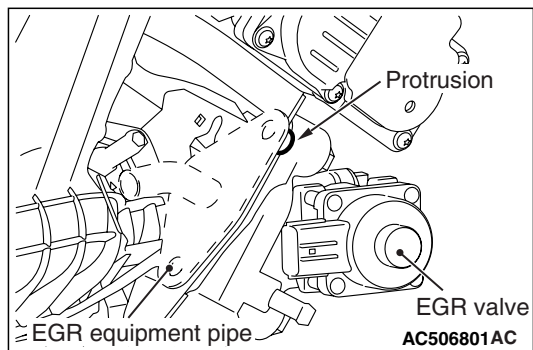
Removal steps (Continued)

7. Water hose connection
8. EGR support stay A
9. EGR support stay B
10. EGR valve support
11. EGR pipe gasket
12. EGR inlet pipe

INSTALLATION SERVICE POINTS

>>A<< EGR PIPE GASKET/EGR VALVE SUPPORT/EGR SUPPORT STAY B/EGR SUPPORT STAY A/ EGR PIPE GASKET/EGR VALVE PIPE/EGR VALVE GASKET INSTALLATION

1. Temporarily tighten each part so that the protrusion of each gasket is positioned as illustrated

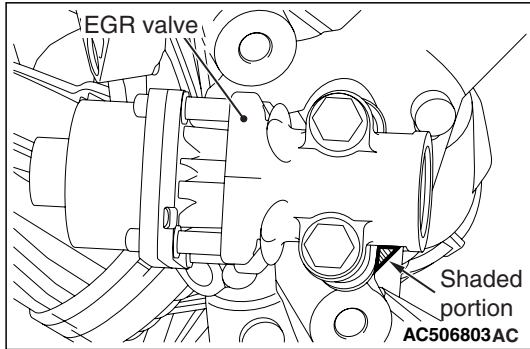


2. Tighten mounting bolts to the specified torque in the order of number shown in the figure.

Tightening torque: 20 ± 2 N·m (15 ± 1 ft-lb)

>>B<< EGR VALVE GASKET INSTALLATION

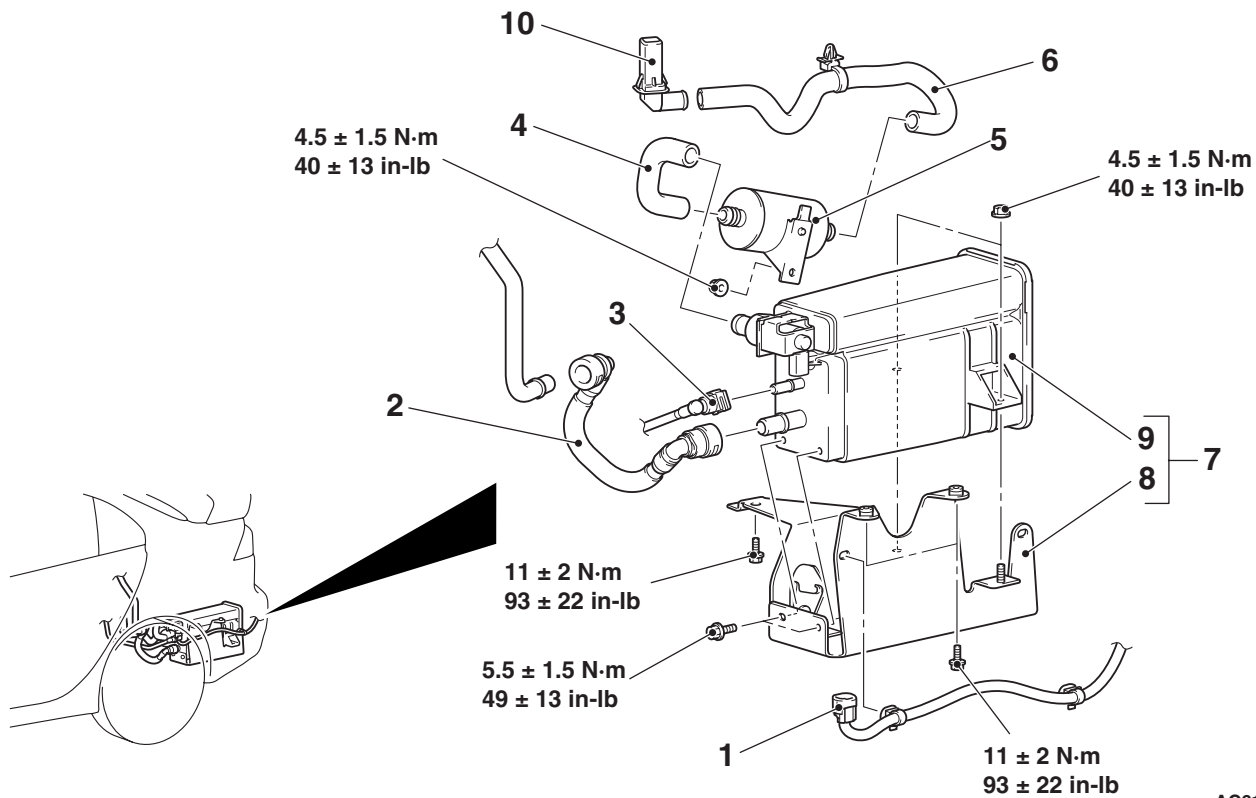
Install the EGR valve gasket so that its shaded portion is set as shown in the figure. Be sure to check which side of the gasket faces outside.



EVAPORATIVE EMISSION CANISTER AND FUEL TANK PRESSURE RELIEF VALVE

REMOVAL AND INSTALLATION

M1173004800508



AC610156AB

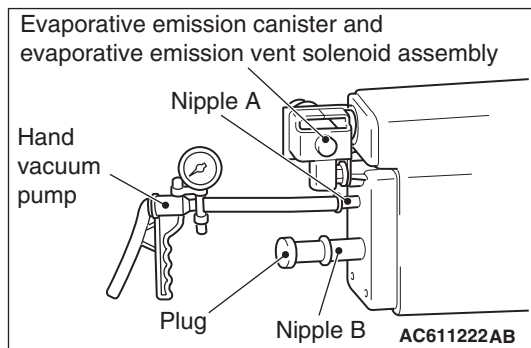
Removal steps

1. Solenoid valve connector
2. Fuel vapor tube assembly
3. Fuel purge pipe assembly connection
4. Vent hose A
5. Air filter

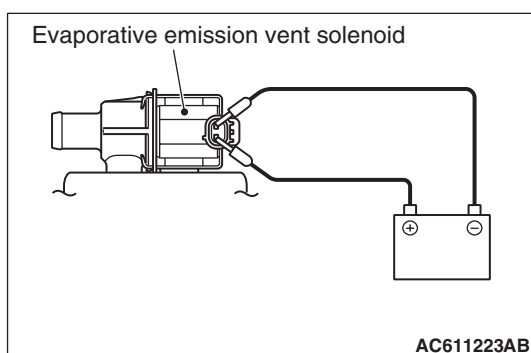
Removal steps (Continued)

6. Vent hose B
7. Fuel vapor canister and bracket assembly
8. Fuel vapor canister bracket
9. Fuel vapor canister assembly
10. Vent pipe

INSPECTION

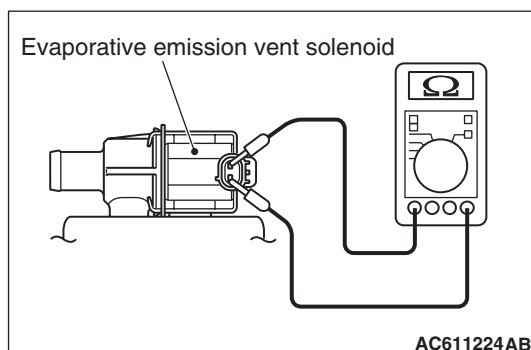
EVAPORATIVE EMISSION VENTILATION
SOLENOID CHECK

1. Connect a hand vacuum pump to nipple (A) of the evaporative emission canister and evaporative emission ventilation solenoid assembly.
2. Connect a plug to nipple (B) of the evaporative emission canister and evaporative emission ventilation solenoid assembly.



3. Check air tightness by applying a vacuum with voltage applied directly from the battery to the evaporative emission ventilation solenoid and without applying voltage.

Battery voltage	Normal condition
Applied	Vacuum maintained
Not applied	Vacuum leaks



4. Measure the resistance between the terminals of the solenoid.

Standard value: 17 –21 Ω [at 20° C (68° F)]